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XX.—*Contributions to Indian Malacology, No. XII. Descriptions of new Land and Freshwater Shells from Southern and Western India, Burmah, the Andaman Islands, &c.*—By W. T. BLANFORD, F. R. S.

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(With Plates II and III.)

More than ten years have elapsed since the last number of these 'Contributions' was published.* The time that I have been able to devote to Zoology in the interim has been occupied with other subjects, and several forms of Indian land-shells that have been in my possession for years have remained undescribed. Of a number of these, I had drawings made some years ago, and several of the figures that accompany the present paper were included in a plate prepared for publication as long since as 1871, but never lithographed.

These ten years have seen so many additions to the literature of Indian land and freshwater shells that the whole aspect of the study has been changed. Foremost in importance are the late Dr. Stoliczka's papers in this Journal† on the anatomy of several forms of *Helicidæ*. The untimely death of Dr. Stoliczka, one of the most able and energetic workers who ever devoted his attention to Indian Mollusca, has prevented the design he had formed of publishing a monograph of Indian *Cyclostomacea*

* J. A. S. B., 1870, xxxix, pt. 2, pp. 9—25.

† Vol. xl, 1871, pt. 2, pp. 143, 217, and xlii, 1873, pt. 2, p. 11.

from being carried out. A considerable number of drawings had been made for the work, in the preparation of which I had agreed to join, but of these drawings the most important, those representing the anatomy of the various genera, are not, I fear, sufficiently clear for publication in their present form, and notes to explain them are wanting. Some of the most useful of Dr. Stoliczka's anatomical studies, those on the structure of various *Helicidae*, have, however, I am much pleased to say, been continued by Colonel Godwin-Austen with important results.

The same decade has seen the completion of a series of illustrations, many of them well executed, of Indian land and freshwater shells, the 'Conchologia Indica' of Hanley and Theobald. The work is mainly due to Mr. Hanley, upon whom the whole of the editorial labour has fallen, Mr. Theobald having been absent in India during the publication. Whilst it is impossible to avoid regretting that more complete illustrations of most of the species have not been given, and that some additional details have not been furnished in the accompanying letterpress,* it is unquestionable that the plates are a valuable contribution to the knowledge of Indian Mollusca.

Two other rather important works on Indian land and freshwater shells have been issued since the completion of the 'Conchologia Indica.' One of these is Mr. Theobald's 'Catalogue of the Land and Freshwater Shells of British India'†, the other, Mr. G. Nevill's 'Hand-list of the Mollusca in the Indian Museum, Calcutta', Part I.‡ The value and accuracy of the first-named work are unfortunately seriously diminished by the great number of misprints, errors, and omissions, partly due to the author's absence from Calcutta when the list was printed. Five quarto pages in small print are filled with additions and corrections; this list, however, is not only far from being exhaustive, but contains some additions to the catalogue of mistakes.§ The 'Notes on the 'Conchologia Indica,'' p. 50, contain some important corrections of localities cited in that work.

* One most important omission might yet perhaps be rectified. A large number of the figures are from types, or from typical examples, and, in such cases, if the figure is correct, there can be no question as to the determination of the species. But many of the figures are from shells that, although doubtless in general correctly identified, are not the specimens originally described, nor even in all cases from the same locality. A list of the figures taken from actual types would be useful in cases of disputed identity.

† Calcutta, 1876, published by Thacker, Spink and Co.

‡ Calcutta, 1878.

§ To justify my criticism of my friend Mr. Theobald's 'Catalogue', I will give two instances of the errors it contains. At p. 15, the genus *Omphalotropis* (with two species *O. disterrina*, B. and *O. aurantiaca*, Desh., is placed in the family *Rissoidae*, subfamily *Pomatiopsinae*. At p. 43, the same genus *Omphalotropis* (with but one species *O. disterrina*, B.) is repeated as a member of the family *Helicinidae*, subfamily *Hydroceniinae*.

Mr. Nevill's 'Hand-list of the Mollusca in the Indian Museum' is especially important for the large number of localities given. In some few instances (as in all such lists), some names will be found to require revision, and one or two instances will be given in the present paper. I have already* expressed my reasons for dissenting in some respects from the classification adopted. But it would be unfair to convey the impression that mistakes are numerous, indeed, considering that Mr. Nevill had not the advantage of correcting the proof-sheets himself, errors, so far as I have examined the work critically, appear singularly few in number, and in many points the classification adopted for the *Helicoidæ* of India is a considerable improvement on anything that had previously been published. At the same time, there is, I believe, very much more to be done before these puzzling shells are properly arranged.†

In the various works just mentioned, some species are quoted by names given by me, at various times, in manuscript, but never published. Of these forms I have given descriptions in the following pages. In several instances, the shells have been figured in the 'Conchologia Indica.' One form thus figured (*Spiraculum mastersi*), I have already described in this Journal (vol. xlvii, 1877, pt. 2, p. 313), and two other species (*Cremnoconchus fairbanki* and *Corbicula iravadica*) represented in the same work require explanation. To facilitate reference, this is given below under the name of each shell.

This mistake is not corrected in the long list of 'Addenda et Corrigenda.' To shew how grave the error is, it is only necessary to mention that the *Rissoïdæ* are as distinct from the *Helicinidæ* in organization as are the *Littorinidæ* from the *Neritidæ*, and that *Omphalotropis* has been clearly proved to belong to neither, but to the *Cyclostomidæ* (See Ann. Mag. & Nat. Hist. May, 1865, ser. 4, vol. iii, p. 341). Moreover, the Indian locality of *Omphalotropis aurantiaca* had been shewn to be erroneous by Hanley in the 'Conchologia Indica.' The error was long since suggested by Benson (Ann. & Mag. Nat. Hist. Sept. 1851, ser. 2, vol. viii, p. 194).

The other error that I shall notice occurs in the 'Addenda et Corrigenda' and runs thus:—"Page 15, add *ACMELLA HYDRIA*, Godwin-Austen. North East Bengal." The reference quoted is "Minutes of the Trustees, Imperial Museum," Calcutta, vol. vii, p. 162. Now the minutes quoted are not published, but merely printed for record, and the notices contained in them of additions to the Museum are mere lists of the names that happen to be attached to specimens, inserted without any attempt at verification. Precisely the same is the case in the 'Register' at the British Museum. Had Mr. Theobald looked at the specimens, or had he made any enquiry about the shell, he would, I think, have easily learned that no such name as '*Acemella hydria*' was ever published, and that the shell so-called, was, if I am not mistaken, *Tricola montana*.

* Proc. A. S. B., 1879, p. 55.

† For instance, I cannot help doubting whether any of the numerous forms referred by Mr. Nevill to *Microcystis* are really congeneric with *H. ornatella* the type of the genus.

Of the remaining species here described, the majority have been collected by Colonel Beddome in the hill-tracts of Southern India. Some of these were sent to me as long as 9 or 10 years ago, others have been received more recently. I feel that I owe many apologies to Col. Beddome and to the other gentlemen, Dr. Anderson, Col. Evezard, and Col. Godwin-Austen, who have kindly entrusted me with the description of their discoveries, for leaving these so long unnoticed.

The plates accompanying the present paper are unfortunately deficient in many respects. Several species are not represented, and some of the representations given are far from being good. The original drawings were, in all cases, excellent, but some of them may, after being kept for several years, have become indistinct in parts, and as the lithographer had not the shells for comparison, he may have misunderstood the details. The larger shells represented in plate iii. are fairly well delineated, but several of the small forms in plate ii. are more or less faulty.

The importance of a careful study of the anatomy in the different forms of *Helicidae* has already been mentioned. Very much remains to be done before anything like a correct classification of the family can be practicable. That all the forms referred to *Nanina* (a name which has no claim to recognition) must be separated from *Helix* is clear enough; the animals belong to different subfamilies at least, but it is by no means certain how many real generic groups there are in the so-called *Nanina*. I suspect that *Macrochlamys*, very possibly with some of the forms referred by Stoliczka to *Rotula*,* will have to be separated generically from another group comprising the sections known as *Hemiplecta* and *Ariophanta*, which are very closely allied to each other, and which are probably congeneric with *Xesta* and several other forms. For the present, I have simply referred the species described to the sections to which they appear to belong, as Stoliczka did, but I am by no means prepared to follow him in accepting such sections as of generic rank. The difficulty is to determine what generic name or names should be adopted. *Nanina* is utterly bad; it offends every law; the name had been used previously by Risso;† the type is the same as that of Benson's genus *Macrochlamys*; and the term is objectionable on account of its signification. All this has been pointed out by Martens,‡ but still he and others employ the name because it has crept into use. Now, in such difficult matters as these generic terms, unless rules are strictly attended to, utter confusion must result, and undoubtedly it has resulted. When, however, a search is made for a better founded term than *Nanina*, endless difficulties are encountered. The ear-

* These appear, however, to deserve distinction from true *Rotula*, see after.

† See Stoliczka, J. A. S. B., 1871, xl, pt. 2, p. 47.

‡ Albers *Heliccen*, 2^{te} Ausgabe, p. 46, where the synonymy is fully discussed.

liest name is *Helicarion* of Ferussac (1822), but it is far from clear that this is not generically distinct from both *Macrochlamys* and *Ariophanta*. The next term is *Stenopus* of Guilding (1828), applied to a West Indian shell. This genus is evidently closely allied to the so-called *Nanina*: the only distinction pointed out by H. and A. Adams* is that the sole in *Stenopus* is narrower than the sides of the foot, but this does not hold good universally.† A better difference is probably the position of the genital orifice, which appears to be, in *Stenopus*, some distance behind the head, as in *Zonites*, and not just behind the right tentacle, as in '*Nanina*.' After *Stenopus* follow *Macrochlamys* of Benson (1832) and *Ariophanta* of Desmoulins (1833), the first founded on *H. indica* (Benson *nec.* Pfr.), believed by many authors to be the same as *H. vitrinoides*, the second founded on *H. lævipes*. The name *Nanina* was given in 1834. My impression is that *Helicarion*, *Macrochlamys*, and *Ariophanta* will have to be accepted as genera, *Nanina* being merely a synonym of *Macrochlamys*.

I must apologize for taking up space by repeating what has been often written before, but it is only right to explain why I now describe as *Hemiplecta*, *Euplecta*, &c. shells allied to others formerly in these 'Contributions' called *Nanina*.

1. ARIOPHANTA IMMERITA. Plate III, Fig. 4, 4a.

Nanina (Ariophanta) immerita, W. Blanf., J. A. S. B., 1870, xxxix. pt. 2, p. 17.

Helix immerita, Pfr., Mon. Hel. vii. p. 128; Hanley & Theobald, Conch. Ind. pl. cl, fig. 7.

This shell was originally described from an immature specimen, and the same was figured in the 'Conchologia Indica.' Subsequently, Col. Beddome obtained an adult shell from the same locality, South Canara. Of this example a figure is now given. The species only differs in sculpture from *A. interrupta*, which is found in various parts of Bengal‡ and Orissa, and has been procured by Col. Beddome as far south as the Golcondah range of hills in Vizagapatam. The two forms replace each other in the eastern and western parts of the Indian peninsula, precisely as do their allies *A. lævipes* and *A. laidlayana*.

2. OXYTES SYLVICOLA, sp. nov.

Testa perforata, depressa, carinata, solidula, olcoso-micans, epidermide crassiuscula obtecta fulva vel luteo-fusca, striis obliquis incrementi

* Gen. Rec. Mollusca, ii, p. 221.

† *E. g.* in *Macrochlamys*, some forms of which at least have the central tract narrower than the lateral.

‡ Amongst the localities given in the 'Hand-list of Mollusca in the Indian Museum,' part i. p. 19, is Singhar. This cannot be Singhgarh near Poona, in the Deccan.

atque lineis impressis minutis spiralibus subdistantibus superne decussata (nucleo sublævigata), subtus lævior sed distincte decussato-striata. Spira parum elevata depresso-conoidea, fere convexa, apice obtuso, suturâ lineari, antice vix impressâ. Anfr. 5½, sensim accrescentes, primi planulati, ultimî convexiusculi, ultimus haud descendens, subtus convexus, modice inflatus, sed infra carinam, nisi juxta aperturam, leviter compressus. Apertura obliqua, angulata-lunaris, intus livido-albida; peristoma acutum, intus subincrassato-labiatum, marginibus callo tenui junctis, columellari curvato, breviter reflexo. Diam. maj. 32, min. 29, axis 17 mm. Apert. 16½ mm. lata, 13½ oblique alta.

HAB. In montibus 'Burail Range' dictis, ad alt. 3000-4000 pedum, in provincia 'North Cachar' Bengalîæ orientalis (*H. H. Godwin-Austen*).

Shell perforate, depressed, carinate, not very thin, having a greasy lustre, and a thick epidermis, tawny or yellowish brown, marked with oblique raised striæ of growth decussated by fine subdistant spiral impressed lines above (the nucleus almost smooth), and with fainter radiating striæ and concentric impressed lines below. Spire but little raised, almost convex, depressedly conoid, apex obtuse, suture linear at first, but slightly impressed near the mouth. Whorls 5½, gradually increasing, the inner nearly flat above, the outer slightly convex; the last not descending, convex and moderately swollen below, but slightly compressed just below the keel, except near the mouth. Aperture oblique, angulately lunate, a little broader than high, pale livid within. Peristome sharp, with a slightly thickened lip inside, the margins joined by a thin callus, columellar margin curved, reflected for a short distance at the perforation. Major diameter 1.26 inches, minor 1.14, axis 0.69, breadth of aperture 0.65, height (measured obliquely) 0.53.

There is a very remarkable resemblance between this shell and that described by me as *Nanina koondaensis* (*J. A. S. B.*, 1870, xxxix, pt. 2, p. 16, pl. iii, fig. 12), yet I am by no means sure that both belong to the same section or subgeneric group. *N. koondaensis* is an ally of *N. indica* (Pfr.) and *N. shiplayi*, shells doubtless nearly allied to *Hemiplecta*, and very possibly belonging to that subgenus, but hitherto referred to *Rotula*,* or to other sections. *O. sylvicola* is larger, more solid, and covered with a distinct epidermis, and the sculpture is less granulate above, the spiral impressed lines being more distant.

I have seen but one specimen of *O. sylvicola*, for which I am indebted to Col. Godwin-Austen. It is figured here. Other specimens, I learn, are larger.

* *Stoliczka*, *J. A. S. B.*, 1871, xl, pt. 2, 231.

3. HEMIPLECTA TINOSTOMA, sp. nov., Plate III, Fig. 1.

Testa anguste umbilicata, convexo-depressa, confertim striis spiralibus minutis lincisque incrementi decussata; fulva, lineâ pallidâ angustâ supra peripheriam, alterâ fuscâ infra, cineta; subtus pallidior, lævior, nitidula. Spira convexa, apice obtuso, suturâ primum lineari, antice impressâ. Anfr. 5, planiusculi, sensim accrescentes; ultimus convexior, antice latior subascendens, ad peripheriam angulatus, subtus convexus, aperturam versus planulatus. Apertura obliqua, multo latior quam alta, lunato-oblonga, intus albescens, fusiâ peripherali albidâ conspicuâ; peristomatis marginibus subparallelis, callo tenui junctis, basali albo, recto, crassiusculo, longe obliquo, ad umbilicum subreflexo, supero arcuato, leviter inflexo. Diam. maj. 50, min. 39, axis 21 mm.; apert. 28 mm. lata, 18 oblique alta.

HAB. In montibus 'Tinnevely Ghats' dictis Indiæ meridionalis, ad latus orientale provinciæ Travancore (*H. Beddome*).

Shell narrowly umbilicate, convexly depressed, closely decussated with fine spiral striæ and lines of growth, smoother beneath, yellowish brown above, paler below, surrounded by a narrow pale line just above the periphery and a dark line below. Spire convex, apex obtuse; suture at first flat, becoming impressed towards the mouth. Whorls 5, the first nearly flat; the last convex above, becoming more so towards the aperture, where it is rather broader and rises a little; below, the shell is convex, but flattened near the mouth, and the greater breadth of the last whorl near the aperture is more conspicuous than above. Aperture oblique, much wider than high, brownish livid, with a whitish enamel within, the pale peripheral band being conspicuous; peristome slightly sinuate, the upper and lower margins nearly parallel, the former slightly inflexed, the latter oblique, straight, white, and somewhat thicker than the other margins. Major diameter 2 inches, minor 1.55, axis 0.85; breadth of aperture 1.1, height (measured obliquely) 0.72.

This shell somewhat resembles *H. basilessa* and *H. beddomei*, but differs from both in the peculiar form of the aperture and the great flattening of the last whorl beneath. The fine, decussated, almost granulate sculpture of the present species, and the less rapid increase of the last whorls would serve to distinguish it from either of the forms named, even if the peculiar shape of the aperture proved to be an individual peculiarity—not a very probable supposition, as there is a faint approach to the same change of form in the last whorl in *H. basilessa*.

But a single specimen has been procured by Col. H. Beddome, and entrusted to me for description. This shell was obtained on the Tinnevely Ghats, between Tinnevely and Travancore, at a spot east of Papanassam, and at an elevation of 5000 feet.

4. HEMIPLECTA ENISA, sp. nov., Plate III, Fig. 2, 2a.

Testa anguste umbilicata, depressa, subcarinata, fulvo-castanea, subtus pallidior; fasciâ exiguâ peripherali albidâ circumdata, confertim striis incrementi lineisque minutis spiralibus subgranulatis decussata, circa umbilicum lævior. Spira depresso-convexa, apice obtuso, suturâ primum lineari, antice impressâ. Anfr. $4\frac{1}{2}$, planiusculi, sensim accrescentes: ultimus superne magis convexus, ad peripheriam subangulatus, antice latior, subtus convexus, juxta aperturam paululo compressus. Apertura obliqua, latior quam alta, lunato-oblonga, supra peripheriam subangulata, intus pallide livida, fasciâ peripherali albescente conspicuâ; peristomatis marginibus subparallelis, callo tenui granulato junctis, supero externoque arcuatis, haud inflexis vel incrassatis, basali albo, recto, obtuso, longe obliquo, ad umbilicum subreflexo. Diam. maj. $42\frac{1}{2}$, min. 36, axis 20 mm.; apertura 23 lata, 17 obliqua alta.

HAB. In montibus 'Aghastyamullay' dictis, inter provincias Tinnevelly atque Travancore, in Indiâ meridionali (*H. Beddome*).

Shell narrowly umbilicate, depressed, subcarinate, yellowish chestnut, paler and dull yellow below around the umbilicus, surrounded by a narrow pale band, which is only well marked near the mouth; the sculpture is fine and subgranulate, formed by decussating striæ of growth and fine spiral lines, the latter disappearing below near the umbilicus. Spire depressedly convex, apex obtuse; suture linear, and not impressed, except in the anterior half of the last whorl. Whorls $4\frac{1}{2}$, all except the last flat, gradually increasing; the last whorl more convex above, especially towards the mouth, where it is slightly broader, subangulate at the periphery, convex below, but a little compressed close to the mouth. Aperture oblique, broader than high, lunately semioval, subangulate at the upper portion of the outer edge, pale livid within, with the narrow whitish band along the blunt keel very conspicuous. The peristome is not thickened, except very slightly along the basal margin, which is white, oblique, and straight for a considerable distance, being very slightly reflected at the umbilicus; the other margins are regularly convex, the upper and lower margins being subparallel; the callus connecting the free margins of the aperture is thin, but granular. Major diameter 1.72 inches, minor 1.4, axis 0.8; aperture 0.95 inch broad, 0.68 high (measured obliquely).

Col. Beddome has sent to me two specimens of this shell, one adult, the other not quite fully grown. The species is near *H. tinostoma*, but is considerably smaller, and the peculiar flattening and compression of the last whorl, near the mouth, is far less, the aperture being, in consequence, not nearly so broad in proportion to the height. Another allied form, also

from Travancore, is *H. basilessa*; but this is a thicker shell, with broader whorls and rather a thick lip to the aperture; the sculpture, too, is different. None of the remaining species of *Hemiplecta* occurring in the Malabar province have the mouth compressed.

5. *XESTINA** *ALBATA*, sp. nov., Pl. III, Fig. 3, 3a, 3b.

Testa angustissime atque subobtecte umbilicata, depresso-globosa, solidiuscula, rugoso-striata, lineis impressis distantibus spiralibus superne circumdata, albida, eburnea. Spira depresso-conica, apice obtuso, suturâ impressâ. Anfr. 5½, convexiusculi, sensim accrescentes, primi translucentes, sublævigati; ultimus primum, nec antice, ad peripheriam subangulatus, aperturam versus latior, vix descendens, subtus subinflatus. Apertura obliqua, late lunaris; peristomate superne simplici, extus subtusque subreflexo, juxta umbilicum reflexo atque subincrassato, margine basali arcuato. Diam. maj. 29, min. 23½, axis 17½ mm.; apert. intus 15 lata, 14 oblique alta.

HAB. Ad Papanassam, in montibus ad latus occidentale provinciæ Tinnevely, Indiæ meridionalis (*H. Beddome*).

Shell very narrowly and subobtectly umbilicate, depressedly globose, subangulate at the periphery, rather solid, ivory-white, the surface wrinkled, forming a coarse oblique striation across the whorls, with fine spiral distant impressed lines on the upper surface only of the two last whorls. Spire depressedly conical, apex obtuse, suture impressed. Whorls 5½, slightly convex, regularly increasing, the first almost smooth and translucent; the last whorl at first subangulate at the periphery, the angulation disappearing some distance behind the mouth, the lower portion inflated near the aperture, which is oblique and broadly lunate. Peristome simple above, subreflected on the outer and basal margins, rather thicker and turned back near the umbilicus, which it partly covers; the basal margin is curved forwards. Major diameter 1·5 inch, minor 0·95 axis 0·7; breadth of aperture inside 0·6, height (measured obliquely) 0·56.

This form is allied to *X. maderaspatana* (*Helix maderaspatana*, auct.), but it is thicker, much more coarsely sculptured, and white in colour. The peristome too is slightly reflected. There is some resemblance also to *X. belangeri* in form, but the mouth is somewhat differently shaped, and the sculpture of *X. albata* is coarser. *X. belangeri* appears to be a near ally of *X. tranquebarica*, *semirugata*, and *bombayana*, forms differing in shape, but so variable and so closely allied that it is very doubtful whether they really merit distinction. All of these forms have a horny shell differing from the ivory-white substance of the species now described.

* Pfeiffer, J. B. Jahrbuch d. Mal. Ges. v, p. 257.

But a single specimen has been sent by Col. Beddome. I think I have seen the same, or a very similar form, from either the Pulneys or some other range of Southern India; but I cannot find specimens in my collection.

6. EUPLECTA VIDUA. Plate II, Fig. 5.

Helix vidua, W. Bl., MSS.; Hanley, *Conchologia Indica*, pl. cxxx. figs. 2, 3.

Nanina climacterica, Bens., var. *vidua*, Nevill, *Hand-list Mollusca*, Indian Museum, Calcutta, pt. i. p. 30.

Testa imperforata, conoideo-depressa, superne oblique confertim atque arcuatim filiformi-costulata, subtus lævigata, polita, radiatim striatula, superne pallide cornea, subtus pallidior. Spira depresso-conica, lateribus subrectis, apice acutiusculo, suturâ impressâ. Anfr. 8, convexi, arcti, lente accrescentes; ultimus superne ad peripheriam angulatus, antice vix descendens, subtus convexus. Apertura obliqua, lunaris, latior quam alta. Peristoma obtusum, leviter sinuatum, intus vix albo-labiatum, margine basali arcuato, columellari vix reflexo. Diam. maj. 17, min. 15½, axis 9½, mm.

HAB. In montibus Garo Khasi et Naga dietis, vallem Assamensem meridiem versus contingens (*Masters, Godwin-Austen*).

Varietas minor, depresso-turbinata, spirâ conicâ. Diam. maj. 14, min. 12½, axis 9 mm. (Pl. II, Fig. 2.)

HAB. Cum præcedente.

Shell imperforate, conoidly depressed, above ornamented with oblique, close, and arcuate fine hair-like costulation, smooth and marked with radiating striæ below; pale horny, paler beneath. Spire depressedly conical, the sides nearly straight, apex rather sharp, suture impressed. Whorls 8, convex, narrow, slowly increasing in size, the last angulate above at the periphery, scarcely descending towards the mouth, convex below. Aperture oblique, lunate, broader than high. Peristome not sharp, slightly wavy, with a very slight white thickening inside, the basal margin curved forward, the columellar scarcely reflected. Major diameter 0·67, minor 0·62, axis 0·38 inch.

The above is the typical form; but there is a smaller variety, depressedly turbinate in shape, with the spire conical, measuring 0·55 inch in its major diameter and 0·36 in height. This form passes by insensible gradations into the type.

The shell represented in the 'Conchologia Indica' is intermediate between the two varieties here described and figured; the apex in the 'Conchologia' figure is more prominent and blunt than in the specimens now before me. These were procured from the Naga hills, south of Gola Ghat, Assam, by Mr. Masters in 1859; other specimens were subsequently

found on the Garo, Khasi, and Naga hills by Colonel Godwin-Austen. The shells from the Khasi hills have the filiform costulation on the upper surface finer and less regular than those from the Assam side of the Naga hills. In Khasi shells 2, 3, or 4 ribs occur at nearly regular intervals, and then a rib appears to be omitted; this is not the case with those from upper Assam.

The species scarcely differs from *E. ornatissima*, found on the other side of the Brahmaputra valley at the base of the Sikkim hills, except in being imperforate. *E. climacterica*, of which Mr. Nevill considers the present shell a variety, is always sharply keeled at the periphery. The two forms may pass into each other, but I have never seen any intermediate links; and as they differ from each other much more than *E. vidua* does from *E. ornatissima*, or *E. climacterica* from *E. austeni*, it is better to have distinctive names for them.

I am indebted to Col. Godwin-Austen for the following note on the animal of *E. vidua* observed at Cherra Poonjee, Khasi hills.

“Animal of a neutral grey tint about the neck and eye-tentacles, which are rather long and fine, the oral tentacles are also of a dark tinge. Extremity of foot truncated, with mucous gland. Body long and thin. No tongue-like processes to the mantle observed.”

The genus *Euplecta* was proposed by Semper* for two Ceylonese shells *Helix subopaca* and *H. layardi*. The latter of these is referred by both Theobald† and Nevill‡ to *Situla*, a position which is scarcely tenable, for the animal of *H. layardi* is destitute of shell-lobes, whilst these are present in *Situla*§; and the odontophores are very different, neither the shape nor number of the teeth being similar. At the same time, I am rather doubtful whether *H. layardi* should not be placed in a separate section from *H. subopaca* on account of differences both in the shell and odontophore. The last-named species, however, is, I think, to be accepted as type. It is greatly to be regretted that Semper should have adopted so loose and uncertain a proceeding as to name two distinct forms as types of one genus. In such a case, the only plan is to take the first-named—in this case, *H. subopaca*—as the type of *Euplecta*.

The genus is thus defined by its author in German:—*On the mantle edge only neck-lobes are present, the left is divided into two separate lappets (as in many Helices). Above the caudal gland there is a short horn. The shell entirely exterior, ribbed or striated above, smooth below. On the*

* *Reisen im Archipel der Philippinen*, 2te theil, Wis. Res. vol. iii, p. 14.

† *Cat.* p. 20.

‡ *Hand-list*, p. 34.

§ See, for description of the animal and odontophore of *Situla* (or *Conulema*, which is the same), Stoliczka, *J. A. S. B.*, 1871, vol. xl, pt. 2, p. 236.

genital organs a cylindrical female supplementary gland (Anhangsdrüse) with a cartilaginous point (analogous to the dart?) ; on the vas deferens (Samenleiter) a closed appendage, in which calcareous concretions are formed, and a flagellum.

The odontophore is not noticed in the generic description. In *E. subopaca*, the number of teeth in each cross-row is about 100, central tooth tricuspid, the neighbouring laterals 12 in number distinctly bicuspid, from the 13th to the 24th almost without a trace of the little lateral point, which, however, reappears in the outer laterals. *Euplecta* belongs to Semper's subdivision *Ceratophora* with a horn-like lobe above the caudal gland, and the sole of the foot divided into a central and two lateral regions as in *Macrochlamys* (and *Stenopus*).

In the characters of both shell and animal, so far as we know the latter, there is a remarkable resemblance between *E. subopaca* and *E. vidua*. The connection between *E. vidua* and *E. climacterica* has already been noticed, and in the latter the odontophore (of which Col. Godwin-Austen has kindly furnished me with notes and drawings) agrees very closely with that of *E. subopaca*. The following is a description of the teeth in *E. climacterica* :—

“Median tooth tricuspid, the central point very long, the lateral cusps very small. The first 14 laterals are long and broad with a single short small cusp on the lower outer margin, the 25 outermost are long narrow, curvilinear, bicuspid, the outer point the shorter, being less than half as long as the inner. Jaw slightly curved, the front edge a little convex.”

The number of teeth in a row is apparently 79. A sketch shews that the form of both central tooth and laterals is very similar to that in *E. subopaca*.

Euplecta is by Semper classed apart from *Rotula*. The animal of the type of this latter genus (*H. detecta*, from Bourbon) is still unknown. Semper has described the anatomy of two very different species, and there is no proof that they are congeneric. It is also extremely doubtful whether, of the forms referred to *Rotula* by Stoliczka,* any belong really to the section ; and I am disposed to believe that Nevill was right in removing them in his ‘Hand-list,’ where, however,† he simply classes them in *Nanina* without specifying any subgeneric group. Judging, it is true, chiefly from the shells, I should class the following Indian and Burmese species in *Euplecta* :—

Helix ponsa,‡ Benson ; from Burma.

* J. A. S. B., 1871, xl, pt. 2, p. 231 ; 1873, xlii, pt. 2, p. 14.

† l. c. pp. 28, 29, 30, &c.

‡ I find this short note on specimens of this species obtained in upper Burma in 1861 :—Animal of the *vitrioides* type, but the projecting lobe (*i. e.*, that above the caudal gland) is small.

Nanina sikrigallensis, Nevill; Bengal, Behar (Hand-list, p. 28).

Helix climacterica, Benson; Assam hills, Burma.

Euplecta vidua, Assam hills.

Nanina austeni, W. Bl.; Garo hills, Assam.

N. falcata, W. Bl.; Garo hills, Assam.

Helix ornatissima, Benson; base of Himalayas, Sikkim and Nipal.

Helix serrula also probably belongs to the same genus. About *H. anceps* and its near ally, *H. arata*, I am more doubtful; for there are shell-lobes to the mantle in the former, and the teeth of the odontophore differ in several particulars.*

As regards *H. indica* (Pfr. nec Benson), *H. shiplayi*, and *H. acuducta*, I cannot now find the notes I made many years since on the animals, but I believe they belong to the forms allied to *Ariophanta*, in which the foot is broad with the sole undivided, and there is no projecting lobe above the caudal gland. The shells present much resemblance to the type of Albers' section *Thalassia*. *H. tugurium* and *H. camura* from Sikkim are still more like *H. subrugata* from Australia, the type of *Thalassia*.

7. SESARA ? INGRAMI.

Helix ingrami, Blanford, Hanley, *Conchologia Indica*, pl. ix. figs. 9, 10.

Rotula diplodon, Bs., partim, Theobald, *Cat. Land & Freshwater Shells Brit. Ind.* p. 21.

Nanina (*Sesara* ?) *diplodon*, Bs., partim, Nevill, *Handlist Moll. Ind. Mus.* pt. i. p. 53.

Testa imperforata, trochiformis, tenuis, diaphana, pallide cornea, minutissime atque confertissime granulatum decussato-striata. Spira subconica, lateribus convexiusculi, apice obtuso, suturá parum impressá, lineá filiformi marginatá. Anfr. 6½, regulariter accrescentes, vix convexiusculi, superiores lævigati; ultimus acute carinatus, non descendens, et supra et infra carinam compressus, basi extus decussato-striatus, atque, præsertim antice, aperturam versus, planulatus, intus convexiusculus atque lævigatus, striis medium versus evanescentibus, regione umbilicali impressá. Apertura diagonalis, incurvo-triangularis, intus tridentatus, dentibus lamelliformibus omnibus basalibus, duobus in peristomate, uno majori fulcato intrante, extus convexo, in medio margine basali, alio minori obliquo subcolumellari, tertio profundo, incurvo, transversim post majorem posito. Peristoma album, modice incrassatum, margine basali sinistrorsum arcuato, dextrorsum subangulatim sinuato, columellari vix reflexo. Diam. maj. 6½, min. vix 6, alt. 4½.

HAB. In montibus 'Yoma' dictis, Pegu ab Arakan secernentibus, haud procul a vico Tongoop.

* Stoliczka, *J. A. S. B.*, 1871, xl, pt. 2, pp. 234, 236.

Shell imperforate, trochiform, thin, translucent, pale horny, very minutely and closely striated both obliquely and spirally, so as to be covered, except on the upper whorls, with fine almost granular decussated sculpture. Spire nearly conical, with the sides slightly convex; apex obtuse; suture very little impressed, and with a filiform line above, the continuation of the keel on the last whorl. Whorls $6\frac{1}{4}$, increasing regularly, nearly flat, only a little convex, the uppermost quite smooth, the sculpture growing stronger on the lower whorls; the last whorl sharply keeled, not descending, compressed both above and below the keel, with the outer portion of the base flat, especially towards the mouth, and decussated, the inner portion moderately convex and smooth, the sculpture gradually disappearing towards the middle; umbilical region impressed. Aperture diagonal, triangular with the sides curved, with three lamelliform teeth inside, all palatal, and in the basal margin: the largest is in the middle of the margin, and is much curved, with its convex side outwards; it begins by forming a kind of thickening to the lip, and then curves away into the interior of the whorl; the second is smaller, oblique, and situated near to the columellar margin; the third is at some distance within the aperture, it is curved, and placed transversely behind the first. Peristome white, somewhat thickened, the basal margin curved forwards near the umbilical region, and angulately curved back near the periphery of the shell; columellar margin scarcely reflected. Major diameter 0.25, minor 0.23, height 0.18 inch.

In the figure in the 'Conchologia Indica,' the internal tooth is not shown, although all the teeth are clearly seen through the semi-transparent base of the shell.

The caudal pore in the animal is very small, and furnished with a lobe in front of it, but the tail is not truncated abruptly as in *Macrochlamys*. This is the only note I can find on the soft parts.

This shell was named in MS. in the year 1861, and a specimen transmitted to Mr. Benson, who, however, doubted whether it could be distinguished from the Khasi-hill form described by him as *Helix diplodon*. The typical specimen of the latter must, I think, have been in poor condition, for it was described as "*laevigata, parum striatula*", whereas fresh specimens exhibit nearly the same fine subgranulate decussating striation as *S. ? ingrami*, and Mr. Benson very probably, and very justly, thought that fresh specimens might agree with the Arakan shell in other characters. Subsequently, fresh specimens of *S. ? diplodon* were obtained from the original locality by Colonel Godwin-Austen; and I find that they differ from *S. ? ingrami* not only in being minutely perforate, a character to which by itself I should attach little or no importance, but also in having but two teeth in the aperture instead of three, the internal transverse tooth of *S. ? ingrami* being deficient in *S. ? diplodon*, whilst the other teeth are

differently shaped. The sculpture is somewhat finer in *S. ? dipledon*, and the basal margin of the aperture is subangularly concave, without the curving forwards due to the transverse portion of the larger tooth in *S. ingrami*. The last character is well shown in the 'Conchologia' figure.

8. *MACROCHLAMYS ? PLATYCHLAMYS*, sp. nov., Plate II, Fig. 9.

Testa perforata, conoideo-depressa, pertenuis, nitida, levigata, sub lente obsolete striatula, fulvo-cornea. Spira parum elevata, apice obtuso, suturâ levi aliquando marginatâ. Anfr. 5, vix convexiusculi, regulariter accrescentes; ultimus non descendens, peripheriâ rotundatus, subtus convexus. Apertura obliqua, lunaris, latior quam alta. Peristoma tenue, simplex, leviter sinuatum, marginibus remotis, callo tenuissimo junctis, columellari brevissime verticali, peranguste reflexo. Diam. maj. 11, min. 9½, axis 5½.

Animal pallio maximo indutum, duos lobos latos linguiformes emittente, qui spiram testæ omnino circumtegent.

HAB. Ad Bombay.

Shell perforate, conoidly depressed, very thin, smooth, and polished, obsoletely striated beneath the lens, fulvous horny in colour. Spire subconical, but little raised, apex obtuse; suture smooth, scarcely impressed, sometimes marginate. Whorls 5, very slightly convex, regularly increasing in size, the last not descending, rounded at the periphery, convex below. Aperture oblique, lunate, broader than high. Peristome thin, simple, slightly curved when viewed from the side; margins distant and united by a thin callus; the columellar border vertical for a very short distance, slightly reflexed. Major diameter 0·44, minor 0·38, axis 0·22 inch.

This shell belongs to the group of thin, more or less depressed forms allied to the type usually known as *M. vitrinoides* (*M. indicus*, Benson). It appears, so far as I can see, to be undescribed, as is also, I believe, an allied form of darker colour, and with a subangulate periphery, occurring at Trichinopoly and elsewhere in the neighbourhood of the Coromandel coast south of Madras.

The animal of *M. platychlamys* is chiefly distinguished by the peculiarly broad shell-lobes, which, instead of being narrow and attenuate towards the ends, as in most allied species, are broad and flat, so as sometimes to cover the whole spire, and usually to conceal all except a narrow band. These lobes somewhat resemble those in the genus *Helicarion*. The lobe above the caudal gland is very much smaller than it usually is in *Macrochlamys* and rounded, not horn-shaped.

This shell is common in the island of Bombay and neighbouring lowlands on the west coast of India, and I have seen a form from the hills of

the Wynaad in Southern India that appears undistinguishable. I have also several specimens of a *Macrochlamys* from the ancient town of Champanir, near Broach, that may very possibly be a variety of *M. platychlamys*. The specimens are larger than the Bombay types, an adult measuring 16 mm. by 14 in its two diameters, and some individuals attain even greater dimensions; the mouth too is rather more convex beneath, but otherwise the two forms agree very closely.

The figure gives the idea of a rather thick shell, and the form of the mouth is incorrect, being too convex below and, consequently, too high in comparison with the breadth.

9. MACROCHLAMYS TENUICULA. Pl. II, Fig. 8.

Macrochlamys tenuicula, H. Ad., P. Z. S. 1868, p. 14, pl. iv, fig. 9.

Helio tenuicula, Pfr., Mon. Hel. vii. p. 94.—Hanley, Conch. Ind. pl. lxxxix, figs. 7, 10.

Macrochlamys effulgens, W. Bl., MSS.—Theobald, Cat. Land and Freshwater Shells of British India, p. 18.

Nanina (Macrochlamys) effulgens, Nevill, Hand-list Mollusca, Indian Museum, Calcutta, part i. p. 26.

Nanina (Microcystis?) tenuicula, Nevill, ib. p. 36.

Testa aperte perforata, turbinata, tenuis, flavo-vel fulvo-cornea, lævigata, nitida, diaphana, oblique striatula, sub lente lineis impressis confertis minutis in anfractibus superioribus subtilissime decussata. Spira subconica, lateribus convexiusculis, apice obtuso, suturâ leviter impressâ. Anfr. 5½-6, convexiusculi, regulariter crescentes, ultimus non descendens, ad peripheriam obsolete subangulatus, angulo omnino antice evanescente, sed in testis junioribus validiore, subtus convexus, radiatim striatulus. Apertura obliqua, ovato-lunaris, latior quam alta. Peristoma tenue, rectum, marginibus subconniventibus, columellari subverticali, breviter reflexo. Diam. maj. 9, min. 8¼, axis 6 mm.

HAB. Ad Bombay et in terris vicinis, necnon in montibus 'Western Ghats' seu 'Syhadri' dictis.

Shell openly perforate, turbinate, thin, yellow or fulvous horny, smooth, polished, transparent, obliquely striated, and under the lens finely decussated on the upper whorls with minute, close, impressed spiral lines. Spire subconical, the sides a little convex, apex obtuse, suture slightly impressed. Whorls 5½-6, rather convex, regularly increasing, the last not descending, obsoletely subangulate at the periphery (in immature shells distinctly angulate), the angle disappearing near the mouth, convex below and radiately striated. Aperture oblique, ovately lunate, broader than high. Peristome thin, straight, the margins approaching each other slightly, columellar

margin subvertical, reflected for a short distance. Major diameter 0·36, minor 0·33, axis 0·24 inch. The foot of the animal is very long and narrow, and there are the usual pointed shell-lobes to the mantle. The colour of the body is almost black.

The shell described by the late Mr. H. Adams as *Macrochlamys tenuicula* appears to me almost certainly to be the immature form of a species common in Bombay. This form I have had for many years; and I formerly distributed specimens under the MSS. name of *Helix effulgens*, a name which has unfortunately got into print. The adult shell has never been described; but the specimen figured in the 'Conchologia Indica' must have been nearly full-grown. Mr. Adams's original types were said to be from Sattara. It is probable they came from the Western Ghats in the Sattara district; but the species may extend to the damper portions of the Deccan plateau.

The figures herewith given are very unsatisfactory; the left-hand figure is quite inaccurate. This, however, is of less importance, as the shell is very fairly represented in the 'Conchologia Indica.'

10. MACROCHLAMYS? PLICIFERA.

Nanina plicatula, W. Bl., J. A. S. B., 1870, xxxix, pt. 2, p. 13, pl. iii, fig. 7, *nee* N. *plicatula*, Mart., Nachrichtsbl. mal. Gesellsch., 1869, i, p. 149.

Helix plicatula, Hanley, Conch. Ind., p. 14, pl. xxviii, fig. 1.

Macrochlamys plicatula, Theobald, Cat. Land and Freshwater Shells Brit. Ind. p. 19.

Nanina, n. sp., Nevill, Hand-list Moll. Ind. Mus. Calcutta, p. 27.

I am indebted to Mr. Nevill for calling attention to the fact that the name I gave to this shell was pre-occupied. I propose to change the specific title to *plicifera*.

11. MACROCHLAMYS? WYNNEI, sp. nov., Plate III, Fig. 5, 5a.

Testa perforata, subturbinato-depressa, striatula, nitida, albido-cornea, diaphana, fasciâ rufâ supra peripheriam circumdata. Spira depresso-conica, apice obtuso, suturâ leviter impressâ, fasciâ rufâ intus marginatâ. Anfr. 5½, lente acerescentes, ultimus peripheriâ rotundatus, subtus modice convexus, aperturam versus vix descendens. Apertura late lunaris, obliqua, diagonalis; peristoma tenue, intus haud incrassatum, margine basali subrecto obtuso, columellari reflexo. Diam. maj. 19, min. 17½, axis 9½ mm. (ex icone). In exemplo minore diam. maj. 13½, min. 12¾, axis 7½ mm. apert. 7 lata, 6 oblique alta.

HAB. Ad Mari (Murrec) in montibus Himalayanis occidentalibus inferioribus haud procul a flumine Jhelun (*A. B. Wynne*).

Var. *major, depressa, anfractibus 6, spirá convexá, parum elevatá: diam. maj. 21 $\frac{1}{2}$, min. 19 $\frac{1}{2}$, axis 10 mm., apert. 11 $\frac{1}{2}$ lata, 10 oblique alta.*

Hab. Etiam ad Mari.

Shell perforate, subturbinately depressed, faintly striated, polished white, translucent, surrounded by a narrow rufous band above the periphery. Spire depressedly conical, apex obtuse, suture slightly impressed, and with a rufous margin inside. Whorls 5 $\frac{1}{2}$, increasing slowly and regularly, the last rounded at the periphery, moderately convex beneath, scarcely descending towards the mouth. Aperture broadly lunate, oblique, diagonal; peristome thin, not thickened inside, basal margin almost straight, columellar reflected. Major diameter 0·76, minor 0·7, axis 0·37 inch (taken from the figure). A smaller specimen measures:—major diam. 0·54, minor 0·5, axis 0·3, breadth of aperture 0·27, height (obliquely measured) 0·23 inch.

There is a larger variety, more depressed, with the spire convex and six whorls. It may possibly be a distinguishable form, but I think not. A specimen measures:—major diameter 0·85, minor 0·78, axis 0·42, breadth of aperture 0·45, height (obliquely measured) 0·4.

I greatly question whether this form is really a *Macrochlamys*, and cannot help suggesting the possibility of its belonging to a different sub-generic group, or even to *Zonites*. However, it is associated at Mari with a true *Macrochlamys* (*M. prona**) and two or three species of *Helicarion*; so it is evident that a few of these tropical types extend to this extreme north-western portion of the Himalayan range, where, however, the majority of the mollusca consist of *Bulimini* of the *Petræus* section.

The specimen of *M. wynnei* from which the accompanying figure was taken has been mislaid or lost, and the description is drawn up from a smaller individual. I have named the shell after Mr. A. B. Wynne of the Geological Survey of India, to whom I am indebted for several mollusca from the neighbourhood of Mari.

I have been in some doubt as to whether this might not be a form of the shell described by Prof. v. Martens as *Nanina jacquemonti* (Malak. Bl. xvi. 1869, p. 75; Pfr. Nov. Conch. iv. p. 48, pl. cxviii, figs. 6-8); but, in the first place, it can scarcely, I think, be the species figured by Jacquemont (Voyage dans l'Inde, Atlas, pl. xvi. fig. 2), and, secondly, *N. jacquemonti* is described as having "*peristoma obtusum, intus incrassatum, margine...basali leviter arcuato,*" none of which can apply to the present species. Pfeiffer's figure in the 'Novitates' shows a very much less oblique mouth than is found in *Macrochlamys? wynnei*. Now, I have another species from Mari, which agrees admirably with Marten's description in these re-

* Nevill, 'Scientific Results of the Second Yarkand Mission,' Mollusca, p. 17.

spects, and which resembles Jacquemont's figure also, but it wants the red band round the periphery shown in Pfeiffer's figure. It is just possible that two species are included by Martens. The true *N. jacquemonti* is probably a *Bensonia*.

12. PUPA (PUPISOMA) EVEZARDI.

"*Pupa (Pupisoma) evezardi*, Blanford," Nevill, Hand-list Moll. Ind. Mus. Calcutta, pt. i. p. 192.

? "*Pupa evezardi*, Blanford MS.," Hanley, Conch. Ind. p. 41. pl. ci, figs. 5, 6.—Theob. Cat. Land & Freshwater Shells Brit. Ind. p. 30.—Pfr. Mon. Hel. viii. p. 416.

Testa imperforata, vix subrimata, conoideo-ovata, tenuis, cornea, lineis elevatis irregularibus filiformibus obliquis ornata. Spira subtus subcylindracea, superne conoidea, lateribus convexis, apice obtuso, suturâ impressâ. Anfr. 4½, convexi, regulariter crescentes, ultimus parum major, periphæria atque basi rotundatus, hæud antice descendens. Apertura diagonalis, truncato-rotunda, edentula; peristoma tenue, rectum, expansiusculum, marginibus conniventibus, columellari verticali, ad basin subtorto, adnato-reflexo, regionem umbilicalem tegente. Long. 2⅔, diam. fere 2, long. ap. 1 mm.

HAB. In cortice arborum ad Khandalla inter Bombay et Poona (*G. Evezard*).

Shell imperforate, with scarcely even a trace of rimation in the umbilical region, conoidly ovate, thin, horny, with raised hair-like oblique lines, rather irregularly disposed, on all the whorls. Spire nearly cylindrical below, conoidal above, the sides convex, apex blunt, suture impressed. Whorls $4\frac{1}{2}$, convex, increasing in size regularly; the last but little larger than the penultimate, rounded at the periphery and below, not descending in front. Aperture diagonal, nearly circular, but truncated above, without teeth; peristome thin, all in one plane, slightly expanded, margins converging; columellar vertical above, slightly twisted below, reflected and united to the whorl so as completely to cover the umbilicus. Length 0.11, diameter 0.08, length of aperture 0.04 inch.

If the form represented by Hanley in the 'Conchologia Indica' be precisely the same as that described above, I am inclined to question the locality given, "Singhur," or, as Mr. Theobald prefers writing it, "Synghar," presumably Sinhgarh, near Poona. The original specimens were found by Colonel Evezard at Karkalla, near Khandalla, at the head of the Bor-ghat; and I suspect that Hanley's figure was taken from one of them. There are two or three allied forms found in the Syhadri range and the Nilgiris, forms that do not appear hitherto to have been described.

The subgenus *Pupisoma* was proposed by Stoliczka* for the Moulmein

* J. A. S. B., 1873, vol. xlii. pt. 2, p. 32.

P. lignicola,* a form very closely resembling *P. evezardi*, but rather shorter and less ovate. It is by no means improbable that intermediate varieties may be found; indeed, so much do I doubt whether the two are really worthy of distinction that I should not have described the present species if the name had not already crept into print.

Mr. Nevill, in his Hand-list *l. c.*, has referred the *Helix orcula* of Benson to the same section of *Pupa* as *P. lignicola*; and in this he is, I think, unquestionably right.

13. SUCCINEA COLLINA.

"*S. collina*, Blanford, MS.," Hanley, Conch. Ind. p. 30, pl. lxxviii. figs. 8, 9, 10; Theobald, Cat. Land and Freshwater Shells Brit. Ind. p. 31; Pfr., Mon. Hel. viii. p. 558; Nevill, Hand-list Moll. Ind. Mus. pt. i. p. 212.

Testa conico-ovata, tenuiuscula, parum nitida, distincte atque flexuose striata, viridescenti-cornea. Spira scalaris, apice acutiuscula, suturâ valde impressâ. Anfr. vix 3, perconvexi, ultimus $\frac{3}{4}$ longitudinis subæquans. Apertura ovata, obliqua; peristoma tenue, margine dextro mediocriter arcuato; columella arcuata, recedens, callosa. Long. 17, diam. 10, alt. (v. diam. min.) 6 mm., apertura 13 mm. longa, vix 9 lata.

HAB. Saxis rupibusque adhærens prope Mahabaleshwar ad summos montes 'Syhadri' seu 'Western Ghats' dictos Indiæ occidentalis.

Var. *aurantiaca v. rufo-cornea; habitat in colle 'Torna' dicto, inter Mahabaleshwar atque urbem Poona.*

Shell conically ovate, rather thin, but little polished, distinctly and flexuously striated, greenish horny in colour. Spire step-like, apex rather pointed, suture much impressed. Whorls scarcely 3, very convex, the last about $\frac{3}{4}$ of the length. Aperture oval, oblique; peristome thin, the right margin moderately curved forwards; the columella arcuate, receding, and covered with a thin callus. Length 0·76, diameter 0·4, height (when laid mouth downwards) 0·24 inch; length of aperture 0·52, breadth 0·36 inch. The largest shell I possess measures 20 mm. in length (0·8 inch). A rufous variety occurs at Torna Hill, near Sinhgarh, west of Poona.

This is a rock-inhabiting species,† found on cliffs and large blocks of basalt at Mahabaleshwar and Torna, and is allied to *S. girnarica*, a larger and thicker form, rather differently shaped, found by Mr. Theobald

* J. A. S. B., 1871, vol. xl. pt. 2, p. 171.

† It is rather difficult to understand why *Succinea* should be placed amongst freshwater shells in the 'Conchologia Indica.' Most of the Indian forms are found either on trees (often on palms) or on rocks, and generally at a distance from water. *Lithotis* and *Camptonyx* are also, I think, incorrectly classed as freshwater shells, both being found on basaltic cliffs.

on the basaltic rocks of Girnar Hill, in Kattywar. The animal of *S. collina* bears a considerable external resemblance to that of the subgenus *Lithotis*, which has a similar habitat.

The figures in the 'Conchologia Indica' give a fair idea of the species, but the spire in fig. 8 is rather too large.

14. STREPTAXIS COMPRESSUS, sp. nov., Plate II, Fig. 13.

"*S. compressus*, Wl. Bl.," Theobald, Cat. Land and Freshwater Shells Brit. Ind. p. 33.

Testa subaperte sed non pervie umbilicata, valde depresso-ovata, cereo-albida, diaphana, nitida, vix striatula. Spira vix convexa, fere plana, suturâ parum impressâ. Anfr. 4½, penultimus postice compressus, obtuse sed prominenter carinatus; ultimus valde eccentricus, antrorsum devians, subtus planulatus politusque, circa umbilicum, præsertim antice, angulato-coarctatus, pone aperturam fossiculis impressis constrictus. Apertura diagonalis, semiovalis, laminâ unâ validâ subbifidâ intrante parietali, dente uno duplici columellari, tribus palatalibus in margine dextro, coarctata. Peristoma incrassatum, undique sublata expansum, postice juxta angulum mediocriter sinuatum, marginibus callo lamellifero junctis. Diam. maj. 6½, min. 3¾, alt vix 3; ap. long. 2½, lat. 2 mm.

HAB. In montibus 'Sivagiri' dictis (Tinnevely) Indiæ meridionalis (H. Beddome).

Varietas anfractibus quinque, superne et in umbilico confertim filiformi-striata, laminâ parietali duplici, in montibus habitat prope urbem Cumbum. Exempli majoris diam. maj. 6½, minoris 5½, diam. min. 4 et 3½, alt. 2¾ et 2½.

Shell rather openly but not perviously umbilicated, depressed, oval, yellowish white, translucent, glossy, scarcely striated. Spire almost flat, suture but little impressed. Whorls $4\frac{1}{2}$, the penultimate compressed and prominently but bluntly keeled posteriorly; the last very eccentric, flattened and smooth below, and angulately compressed around the umbilicus, and especially near the mouth, where there are indentations corresponding to the teeth inside. Aperture diagonal, semioval, and furnished with five teeth, one strong re-entering bifid plait on the parietal callus uniting the margins of the peristome, one large double tooth on the columellar side, three palatal teeth on the right side. Peristome thickened and expanded, curved back near the posterior angle. Major diam. 0.25, minor 0.15, height 0.11 inch.

A variety from the Cumbum hills has distinct but very fine close filiform raised lines on the upper surface and inside the umbilicus, and the

parietal lamina is double. Some specimens are rather smaller than the type. It is doubtful whether these differences justify a separate name.

15. *STREPTAXIS PERSONATUS*, sp. nov., Plate II, Fig. 10.

"*S. personatus*, Wl. Bl.," Theobald, Cat. Land and Freshwater Shells Brit. Ind. p. 33.

Testa umbilicata, depressa, sphaeroideo-ovata, lævigata, nitidula, diaphana, cereo-albida. Spira depressa, apice vix exserto, suturâ impressâ. Anfr. 5, convexi, penultimus postice rotundatus, vix ultra ultimum (a basi spectatus) projiciens; ultimus eccentricus, antrorsum devians, subtus convexus, circum umbilicum compressus, post aperturam fossiculis impressis constrictus. Apertura obliqua, fere semiovalis, laminâ unâ validâ flexuosâ intrante parietali, dentibusque 5, tribus in margine columellari, duobus in dextro, harum uno inferiore majore laminæ parietali opposito, alio minore superiore, coarctata. Peristoma incrassatum continuum, fere solutum, album, undique late expansum, postice juxta angulum subprofunde retrosinuatum, margine parietali valido, concavo. Diam. maj. 5, min. $3\frac{3}{4}$, alt. $2\frac{1}{2}$.

HAB. In montibus haud procul ab urbe Cumbum (Madura) India meridionalis (*H. Beddome*).

N. B. *In nonnullis exemplis peristoma quadri-vel tridentatum nec quinquedentatum est, dente uno columellari et aliquando uno palatali carens.*

Shell umbilicated, depressed, spheroidally ovate, smooth, moderately polished, translucent, pale yellowish white. Spire depressed, the apex scarcely exserted, suture impressed. Whorls 5, convex, the penultimate rounded behind, scarcely projecting beyond the last when seen from below; the last eccentric, convex below, compressed around the umbilicus, and constricted by pits corresponding to the teeth inside, just behind the mouth. Aperture oblique, irregularly semioval, and furnished with one strong re-entering parietal lamina, curved inside, and with five teeth, three on the columellar margin, two on the right; of the latter the lower is larger and opposite to the parietal lamina, the smaller is above, nearer to the angle. Peristome thickened, continuous, almost free (the thick callus which unites the columellar and dextral margins projecting from the last whorl, in a hollow curve, the concavity corresponding to the parietal lamina); the outer margins expanded, the right margin deeply recurved close to the posterior angle. Major diameter 0.2, minor 0.15, height 0.1 inch.

In other specimens, rather worn, and with the peristome somewhat less developed, the teeth are rather smaller, the upper columellar tooth is wanting, and in one case the upper tooth on the right margin is also de-

ficient. All, however, are characterized by the great development of the parietal callus.

16. *STREPTAXIS CONCINNUS*, sp. nov., Plate II, Fig. 11.

Testa umbilicata, depressa, globoso-ovata, striatula, nitidula, diaphana, cerreo-albida. Spira depresso-conica, parum exserta, apice obtusiusculo, suturâ impressâ. Anfr. 5, convexi, penultimus postice rotundatus, haud ultra ultimum (a basi spectatus) projiciens; ultimus inflatus, multo major, eccentricus, antrorsum devians, subtus convexus, lævigatus, politus, circum umbilicum praesertim antice compressus, post aperturam fossiculis impressis constrictus. Apertura obliqua, fere semiovalis, lamellis duobus intrantibus parietalibus, sinistrâ longiore, intus tortâ, dentibusque 5, duobus columellaribus, superiore minore juxta umbilicum, inferiore magno duplici, uno basali lamelliformi transverso, duobusque in margine dextro, inferiore subbifido, superiore minore, coarctata. Peristoma album expansum, ad angulum postice vix sinuatum, marginibus callo duas lamellas ferente junctis. Diam. maj. $5\frac{3}{4}$, min. 4, alt. $3\frac{1}{4}$ mm.

HAB. In montibus 'Balaramang' dictis (Mysore) Indiæ meridionalis (H. Beddome).

Shell umbilicated, depressed, globosely ovate, rather indistinctly striated, shining, translucent, pale yellowish white. Spire very low, scarcely exserted, apex blunt, suture impressed. Whorls 5, convex, the penultimate rounded behind, and not projecting, when viewed from below, beyond the lower whorl; the last whorl much larger than the others, eccentric, convex below, smooth and polished, compressed around the umbilicus, especially near the mouth, and constricted by indentations, corresponding to the teeth inside, just behind the lip. Aperture oblique, nearly semioval, and furnished with two plaits on the parietal side, that to the left (nearest to the umbilicus) longer than the other and bent inside; there are five teeth in the peristome, one on the columellar margin near the umbilicus, a second large and double nearer the base, one lamellar and transverse at the base, two inside the right margin, the lower being larger than the other and almost bifid inside. Peristome white, slightly expanded, scarcely sinuate near the angle, margins joined by a callus bearing the two parietal plaits. Major diameter 0.23, minor 0.2, height 0.13 inch.

This is the only known species from Southern India, so far as I am aware, in which, when the shell is viewed from below in the direction of the axis, the penultimate whorl does not project at all beyond the body-whorl. The transverse lamellar tooth at the base of the aperture is also peculiar.

17. *STREPTAXIS PRONUS*, sp. nov., Plate II, Fig. 12.

Testa umbilicata, depresso-ovata, superne confertim atque arcuatim costulato-striata, nitidula, diaphana, cerco-allida. Spira depresso-conica, parum exserta, apice obtuso, suturá parum impressá. Anfr. 5½, superiores convexiusculi, penultimus postice rotundatus, longe ultra ultimum (a basi spectatus) projiciens; ultimus valde eccentricus, antrorsum devians, subtus subplanulatus, levigatus, in umbilico striis filiformibus flexuosis ornatus, circum umbilicum compressus atque aperturam versus angulatus, juxta peristoma scrobiculis constrictus. Apertura obliqua, truncato-ovalis, lamellá validá parietali intrante flexuosá, antice subbifidá, dentibusque quatuor, uno columellari, alio basali, duobus in margine dextro, coarctata. Peristoma incrassatum, subcontinuum, album, expansum, marginibus callo crasso lamellifero junctis, dextro prope angulum sinuatum. Diam. maj. 6½, min. 4, alt. 3 mm.

HAB. In montibus haud procul ab urbe Tinnevely Indiæ meridionalis (*H. Beddome*).

Shell umbilicated, depressedly ovate, closely and arcuately ornamented above with subcostulate striation, polished, translucent, pale yellowish white. Spire low, conical, but little exserted, apex obtuse, suture but little impressed. Whorls $5\frac{1}{2}$, the upper slightly convex, the penultimate rounded behind and projecting considerably beyond the lower whorl when viewed from below; last whorl very eccentric, somewhat flattened beneath, smooth, except within the umbilicus, where there are fine, irregularly flexuous filiform raised lines on the surface, compressed around the umbilicus and angulate near the aperture, where there are deep indentations corresponding to the teeth inside. Aperture oblique, truncately oval, furnished with a strong re-entering parietal plait, curved within and subbifid in front, and with four teeth—one columellar, one basal, and two (of which the upper is small) inside the right margin. Peristome thickened, subcontinuous, white, expanded, the margins joined by a thick callus projecting from the body-whorl and bearing the parietal lamella. Major diameter 0.26, minor 0.16, height 0.12 inch.

This shell resembles *S. compressus* in form, but it wants the angulation of the penultimate whorl. The peristome is much thickened, as in *S. personatus*.

The forms of *Ennea* and *Streptaxis* described in this paper are the principal that have been collected in the Southern Indian mountains by Colonel Beddome, from whom I have received specimens from various localities from time to time. All of the species of *Streptaxis* are somewhat variable, and, with a large collection from South India, it would

probably be found that many intermediate varieties occur. As a rule, the general form appears more constant than any other characters, and the teeth in the mouth vary considerably. The parietal lamellæ are peculiarly inconstant. Thus, the original type of *Streptaxis perrotteti*, the common species on the top of the Nilgiri hills, has two lamellæ*; but I have a variety from Ootacamund in which the smaller of the two, that nearer to the angle of the mouth, is obsolete, and in other specimens from the same locality there is but a rudimentary representation of this plait. It was the form with a single lamella which was compared with *S. watsoni* when the latter was originally described (J. A. S. B., 1860, xxix, p. 127). The variation in the teeth of *Streptaxis* has already been noticed in these contributions J. A. S. B., 1861, xxx, p. 359.

The genus *Streptaxis* is abundantly represented on the various hill-groups of Southern India, especially on the higher elevations of the Syhádri, or Western-Ghat range. The most northern locality from which I possess a specimen is the hill-fort of Torna, near Sinharh, west of Poona, in the Bombay Presidency. The shell in question is weathered, and not in very good condition; it is a large form (that is, large compared to the minute species described in the preceding pages), measuring $11\frac{1}{2}$ mm. by $8\frac{1}{2}$, and it is nearly allied to the Nilgiri *S. perrotteti*, and perhaps still more nearly to the Ceylon *S. cingalensis*.

18. ENNEA MACRODON, sp. nov., Plate II, Fig. 15.

Testa flexuose rimata, subcylindrico-turrita, diaphana, nitidula, confertim capillaceo-costulata, cereo-albida. Spira elongata, sursum parum attenuata, lateribus subrectis, apice obtuso, suturâ impressâ. Anfr. 7, convexi, duo superiores lævigati: ultimus aperturam versus subascendens. Apertura verticalis, oblique semiovalis, lamellâ validâ bicurvi intrante parietali, aliâ columellari profundâ, dentibusque tribus, uno tuberculiformi columellari, alio magno lamelliformi transverso basali latus dextrum versus, tertio minore in margine dextro, coarctata. Peristoma album, expansum, juxta anfractum penultimum sinuatum, marginibus callo lamellifero junctis. Long. 5, diam. vix 2, ap. long. $1\frac{1}{4}$ mm.

HAB. Apud Pykara in summos montes 'Nilgiri' dictos Indiæ meridionalis.

Shell flexuously rimate, subcylindrically turreted, translucent, polished, yellowish white, closely sculptured, except on the apical whorls, with fine hair-like vertical costulation. Spire turreted, elongate, diminishing very slowly in thickness upwards, the sides nearly straight, the apex blunt and rounded, the suture impressed. Whorls 7, convex, the first two smooth,

* Petit, quoted by Pfeiffer, Mon. Hel. i. p. 9.

the last ascending very slightly near the aperture. Aperture vertical, semioval, obliquely truncated above, and very much contracted by teeth, consisting of a strong re-entering bifid parietal* plait on the callus connecting the margins of the peristome, an internal re-entering columellar lamina, commencing at a distance within the mouth, and three teeth—one, more or less tubercular, on the left or columellar side, a second tubercular tooth on the right margin, opposite the parietal plait, and with it nearly cutting off the posterior corner of the aperture, and a third, broad, lamelliform, and transverse (parallel to the plane of the mouth) on the right side of the basal margin. Peristome white, expanded throughout, curved a little back near the angle, where it meets the penultimate whorl, the margins united by a callus bearing the parietal lamella. Length 0·21, diameter 0·075, length of aperture 0·05 inch.

I obtained several specimens of this shell near Pykara, on the Nilgiri hills of Southern India, in 1858, and for a long time supposed it to be *E. pirriei* of Pfeiffer,† but I noticed it as a distinct form when describing *E. sculpta* (J. A. S. B., 1869, xxxviii, pt. 2, p. 141), and mentioned some of its peculiarities. *E. macrodon* is distinguished not only from *E. pirriei*, but also from all other Indian species of the genus, by its strong basal transverse lamelliform tooth. This character serves to distinguish the two species at all ages; for in the present species, as in *E. sculpta*, *E. pirriei*, and, doubtless, in the two forms (*E. exilis* and *E. subcostulata*) described below, the apertural teeth, and especially the parietal lamella, are well developed in immature shells even before all the whorls are completed. *E. macrodon*, too, is only half the size of *E. pirriei*, and there appear to be several slight differences in form, sculpture, and dentition.

19. ENNEA SUBCOSTULATA, sp. nov., Plate II, Fig. 14 (*upper*).

Testa arcuato-rimata, subcylindrico-turrita, diaphana, nitida, cereo-albida, confertim subobsolete costulata. Spira parum attenuata, lateribus convexiusculis, apice obtuso, suturá impressá. Anfr. 7½, convexiusculi, ultimus antice breviter ascendens. Apertura verticalis, oblique semiovalis, lamellá validá intrante bicruri, flexuosá, parietali juxta angulum, aliá profundá columellari, et quatuor dentibus, uno columellari, duobus basalibus, quarto dextrali plicæ parietali opposito, coarctata. Peristoma expansum, albidum, juxta anfractum penultimum sinuatum, marginibus callo lamellifero junctis. Long, diam. 2, ap. long. 1¼ mm.

* For the meaning of the terms palatal, parietal, and columellar, applied to teeth within the mouth, see Pfeiffer, Mon. Hel. ii, p. 300, note.

† It was quoted as that shell, J. A. S. B., 1860, xxix, p. 126, and 1861, xxx, p. 364.

HAB. In montibus 'Shevrai' vel 'Shevroy' dictis, haud procul ab urbe Salem, Indiæ meridionalis (*H. Beddome*).

Shell arcuately rimate, subcylindrically turreted, translucent yellowish, white, finely and somewhat indistinctly ribbed. Spire turreted, elongate, becoming rather smaller above, with the sides rather convex, the apex blunt, and the suture impressed. Whorls $7\frac{1}{2}$, moderately convex; the last whorl ascending slightly close to the mouth. Aperture vertical, semioval, obliquely truncated, with a strong re-entering parietal plait, bifid and flexuous within, near the posterior angle, a columellar lamina at a distance within the mouth, and four tubercular teeth—one columellar, two basal, and the fourth inside the right margin opposite to the parietal plait, so as partly to cut off the upper (posterior) portion of the mouth. Peristome white, expanded, except near the junction with the last whorl, where the edge is curved back somewhat; margins united by a callus, on which is the parietal plait. Length 0·22, diam. 0·075, length of aperture (including peristome) ·05 inch.

I have received from Col. Beddome three specimens of this species, two of which are evidently immature; the third I believe to be full-grown, but the peristome may perhaps be more fully expanded in older examples.

E. subcostulata is allied to *E. pirriei*, *E. sculpta*, *E. macrodon*, and their allies, but is distinguished from all by sculpture and the form of the teeth in the mouth. It was, I believe, this species which was erroneously quoted as *E. pirriei* from the Shevroy hills (J. A. S. B., 1861, xxx. p. 364).

20. ENNEA EXILIS, sp. nov., Plate II, Fig. 14 (*lower*).

Testa rimata, subcylindrico-turrita, diaphana, lævigata, nitidula, albidocerea. Spira elongata, sursum vix attenuata, lateribus apicem versus convexis, apice obtuso, suturâ parum impressâ. Anfr. 6½-7, convexiusculi, ultimus antice subascendens. Apertura fere verticalis, oblique semiovalis, lamellâ validâ intrante bicurvi parietali, aliâ profundâ columellari spirali, dentibusque quatuor, uno columellari, duobus basalibus quasi-junctis, quartoque minore in margine dextro, coarctata. Peristoma expansum, albidum, postice juxta angulum sinuatum, marginibus callo lamellifero junctis. Long. $4\frac{1}{2}$, diam. $1\frac{1}{2}$, ap. long. 1 mm.

HAB. In montibus 'Balarangam' dictis provinciæ Mysore in India meridionali (*H. Beddome*).

Shell rimate, subcylindrically turreted, translucent, smooth, polished, yellowish white. Spire turreted, elongate, diminishing very slowly indeed below, but more rapidly above, where the sides are convex, apex blunt,

suture slightly impressed. Whorls $6\frac{1}{2}$ -7, slightly convex, the last whorl ascending very little near the mouth. Aperture nearly vertical, semioval, obliquely truncated, with a strong re-entering bifid palatal plait on the callus uniting the margins of the peristome, a spiral columellar lamina commencing at a distance within the mouth, and four tubercular teeth just inside the peristome*—one columellar, two joined together at their base, at the lowest part of the aperture, and one, very small, inside the right margin and opposite to the large parietal plait. Peristome white, slightly expanded, except near the junction with the last whorl, where the margin is slightly curved back. Length 0.18, diameter 0.06, length of aperture 0.04 inch.

This form, of which I have received four specimens from Col. Beddome, is distinguished from its allies by being quite smooth. As in the case of some of the allied forms, it is not improbable that in old specimens the peristome may be more broadly expanded and the palatal teeth may become more or less obsolete.

21. ENNEA STENOSTOMA, Bedd. MS., Plate II, Fig. 17.

Testa longe profundeque rimata, pupiformis, cylindraceo-ovata, solidula, lævigata (forsan aliquando oblique striata), impolita, haud nitida, albidula. Spira subcylindrica, lateribus convexiusculis, apice rotundato, obtuso, suturâ impressâ. Anfr. $6\frac{1}{2}$, convexi, quatuor penultimi subæquales; ultimus post aperturam valde compressus, haud ascendens, capillaceo-striatus, lateribus ambobus juxta peristoma scrobiculis impressis constrictus. Apertura verticalis, subaxialis, non lateralis, suboblunga, altior quam lata, marginibus lateralibus concaviusculis, basali convexo, dentibus valde cœcrotata, plicâ unâ validâ simplici intrante parietali juxta angulum, tuberculis duobus columellaribus, uno superiore profundo, alio majore inferiore in peristomate, duobus minoribus basalibus, uno dextrali, alio sinistrali, uno denique majore bifido in margine dextro, plicæ parietali opposito sed inferiore, munita. Peristoma album, reflexum, postice sinuatum, marginibus callo lamellifero junctis. Long. $3\frac{1}{2}$, diam. $1\frac{1}{2}$, ap. long. $1\frac{1}{4}$ mm.

HAB. In montibus 'Golconda' dictis, haud procul ab urbe Vizagapatam (H. Beddome).

Var. *minor*, anfractibus $5\frac{1}{2}$; long. 3, diam. $1\frac{1}{2}$, ap. long. $1\frac{1}{2}$ mm. (Pl. II, Fig. 16.)

HAB. In montibus haud procul ab urbe Karnul (Kurnool) Indiæ meridionalis, (H. Beddome).

* None of the teeth are well represented in the figure.

Shell with a long deep groove at the base, pupiform or cylindrically ovate, rather thick, smooth (perhaps sometimes obliquely striated), dull, destitute of polish, whitish. Spire subcylindrical, with the sides slightly convex, the apex blunt and rounded, and the suture impressed. Whorls $6\frac{1}{2}$, convex, the four behind the last whorl subequal, the penultimate being scarcely smaller; the last strongly compressed behind the aperture, with raised hair-like lines of sculpture, not ascending, deeply indented on both sides. Aperture* vertical, nearly in the axis of the shell, not lateral, nearly oblong in shape, higher than broad, both the right and left margins slightly concave, lower margin convex. Teeth in the mouth numerous, and consisting of the simple† strong re-entering parietal fold near the posterior angle, two columellar tubercles (the upper and smaller situated at some depth inside the mouth, the smaller and larger in front close to the lip), two small basal teeth right and left of the lowest portion of the mouth, and one large bifid tooth on the right margin nearly opposite to the parietal fold, but not very close to it, and rather inferior to it in position. Peristome white, expanded throughout, curved back near the posterior angle, the margins united by a thick callus, on which the parietal lamina is situated. Length 0·14, diameter 0·06, length of aperture 0·05 inch.

The typical form was obtained in the Golconda hills near Vizagapatam, and the single specimen sent to me by Col. Beddome, from which the accompanying figure was taken, was broken after being drawn. The description is from a specimen in the British Museum.

A smaller variety with $5\frac{1}{2}$ whorls, and measuring 0·12 inch in length, 0·06 in diameter, and 0·37 in length of aperture, was procured by the same naturalist in the hills near Kurnool.

I have received three specimens of this variety from Colonel Beddome, and there are others in the British Museum. All have the same dull weathered appearance, though they look fairly fresh; but on one there appear what may be traces of sculpture, apparently striæ similar to the fine raised lines occurring on the last whorl near the aperture in all.

I am not acquainted with any species of *Ennea* nearly allied to this species. In form, the Sikkim and Khasi *E. stenopylis* shows some resemblance; but that shell is strongly costulate, and its curious aperture, with the posterior portion almost cut off and forming a semi-detached tube, shows the species to be merely an ovate form of the Himalayan and Burmese group, comprising *E. vara*, *E. blanfordiana*, and *E. cylindrelloidea*.

* It is too broad in figure 17, and the shape is incorrect. The teeth, however, are nearly correct.

† Erroneously represented as double in fig. 17 on the accompanying plate.

22. ENNEA BEDDOMEI, sp. nov.

Testa rimata, subcylindraco-turrita, cereo-albida, nitida, confertim verticaliter costulata, costulis in anfractu ultimo plus minusve obsolete. Spira elongata, sursum attenuata, apice obtuso, suturá impressá. Anfr. 6, convexi, ultimus antice ad aperturam vix ascendens. Apertura fere verticalis, semielliptica, lamellis duobus validis parietalibus, uná anteriore dextrali intrante intus tortá, aliá profundá sinistrali subcolumellari incurvá, dentibusque lamelliformibus minoribus duobus vel tribus profundis palatalibus coarctata. Peristoma albidum, expansum, postice juxta angulum leviter sinuatum, marginibus callo lamellifero junctis. Long. $3\frac{2}{3}$, diam. $1\frac{1}{3}$, ap. long. $\frac{2}{3}$ mm.

HAB. In montibus 'Sivagiri' dictis (Tinnevelley) Indiæ meridionalis (*H. Beddome*).

Shell rimate, subcylindrically turreted, pale yellowish white, polished, with close vertical ribbing on all the whorls, the ribs being more or less flattened and obsolete on the last. Spire elongate, becoming more slender above, apex blunt, suture impressed. Whorls 6, convex, the last scarcely ascending in front at the mouth. Aperture nearly vertical, semi-elliptical, with two strong re-entering parietal lamellæ—one of them in front to the right near the angle of the mouth, slightly twisted inside, the other to the left near the columellar margin, commencing at a distance within the mouth, and curved; there are also two or three small depressed lamelliform palatal teeth; but they are seen with difficulty from the front. Peristome white, expanded, the margins united by a callus bearing the parietal folds, the right margin curved back near the angle. Length 0.15, diam. 0.05, length of aperture 0.025 inch.

I have named this shell after the discoverer instead of adopting the term he had given to it in MS., as the latter might be objected to and changed. I have no specimen myself at present, but there are four in the British Museum. The form is peculiarly distinguished by the absence of any teeth in the peristome itself, although there are two or three at a little distance inside the aperture, and two folds on the callus joining the margins of the lip. In general form there is some resemblance to *E. exilis*.

23. ENNEA CANARICA, Beddome, MS.

Testa rimata, turrita, albida, solidula, confertim verticaliter costata. Spira subregulariter attenuata, apice obtuso, suturá profundiusculá. Anfr. $5\frac{1}{2}$, convexi, infra saturam inflati, gradatim crescentes, ultimus antice vix ascendens. Apertura subrotunda, superne truncata, lamellá validá parietali intrante subtortá, partem posteriorem aperturæ fere discernente, aliáque

columellari profundâ, vix in fauce conspicuâ, coarctata; dentibus palatalibus in peristomate nullis. Peristoma continuum, longe adnatum, album, incrassato-patens, undique expansum, intus granulatum, margine columellari angulatim incisum, basali lato, dextrali intus juxta lamellam parietalem breviter projiciente, angulum versus leviter retro-sinuatum. Long. $3\frac{3}{4}$, diam. 2, ap. intus $\frac{2}{3}$ mm. alta.

HAB. In provincia 'South Canara' ad latus occidentale Indiæ meridionalis (*H. Beddome*).

Shell rimate, turreted, white (fresher specimens are probably yellowish white and polished), all the whorls ornamented with close vertical ribs. Spire almost regularly attenuate, apex blunt, suture rather deep. Whorls $6\frac{1}{2}$, convex, swollen, and projecting beneath the suture, increasing in size by degrees, the last not ascending near the mouth. Aperture nearly round, except above, with one strongly developed parietal lamella, commencing in the front and re-entering deeply, a little twisted within, and so large as almost to cut off the upper left or posterior portion of the aperture; another smaller, deep-seated columellar fold is scarcely discernible from the mouth; no palatal teeth. Peristome continuous, attached for a considerable distance to the last whorl, white, thickened, broadly expanded, granulate inside; the columellar margin with an angular incision, the basal margin broader than the others, right margin curved back near the angle, and having a blunt projecting tooth-like process inside, opposite the parietal fold. Length 0.15, diameter 0.08, length of aperture within 0.025 inch.

The above description is taken from the only specimen I have ever seen, which is in the British Museum. The shell is remarkable for its peculiarly shaped whorls, each of which is suddenly swollen below the suture, so as to give almost a step-like appearance to the spire. The rounded mouth, too, with the broadly expanded peristome is quite different from that of any other Indian form of the genus. Perhaps the Khasi-Hill *Ennea vara* is as closely connected as any of the South-Indian forms, though there is but little resemblance between it and the present species, except such as is due to both being strongly ribbed, and to the manner in which the posterior or upper right-hand corner of the mouth is almost isolated by the strong parietal lamella and a projection from the inner margin of the peristome.

24. HELIX CALPIS.

Bens., Ann. & Mag. Nat. Hist. ser. 3, vol. iii, p. 268.—Pfr., Mon. Hel. v. p. 64.—Hanley, Conch. Ind. pl. xvi. fig. 8.

Macrochlamys calpis, Theobald, Cat. Land Freshwater Shells Brit. Ind. p. 19.

? *Nanina (Microcystis) calpis*, Nevill, Hand-list Moll. Ind. Mus. pt. i. p. 38.

This species was described from specimens collected by myself in 1856. I had but an imperfect knowledge of land mollusks at the time, or I should, I think, have seen at once, as I did some years afterwards, when re-examining my collections, that the shells were all young specimens of *Raphaulus* (*Streptaulus*) *blanfordi*. I had altogether a considerable number of specimens of the supposed *Helix calpis*; of these four were sent to England, and were examined by Mr. Benson; and it is manifest, from his description, that there was no difference between his examples and mine. In some of the latter I found the operculum still remaining.

In Mr. Nevill's Hand-list of Mollusca in the Indian Museum, Calcutta (*l. c.*), specimens of *Nanina calpis* from the Nága and Khási hills are included. *Streptaulus blanfordi* has been found in Sikkim, and in the Daffa hills, east of Bhutan; and I learn from Col. Godwin-Austen that he obtained a specimen from Brahmakúnd at the head of the Assam valley; but, as no example of the shell is known to have been found in the hill-ranges south of Assam, I think the specimens in the Indian Museum must be something different from the form described as *Helix calpis* by Mr. Benson.

25. SPIRACULUM TRAVANCORICUM, Beddome, MS., Plate III, Fig. 6.

Testa late umbilicata, depresso-turbinata, in exemplo vetusto adhuc detecto lævis, albescens (junior forsan epidermide induta, colorataque). Spira elevata, depresso-conica, suturâ profundâ, apice acuto. Anfr. 4½, rotundati, ultimus cylindræceus, aperturam versus descendens atque breviter solutus, 3 mill. pone aperturam tubulo longiusculo antrorsum directo, anfractum penultimum tangente, munitus. Apertura diagonalis, circularis; peristoma duplex, internum breviter porrectum, superne sinistrorsum leviter sinuatum, externum expansum, atque, nisi ad marginem sinistrum, undulatum. Operculum extus fere planum, marginibus anfractuum exteriorum liberis, intus concavum. Diam. maj. 12½, min. 10½, axis 7, diam. apert. 5½ mill.

HAB. In montibus Travancoricis haud procul a Tinnevelly (*H. Beddome*).

Shell broadly umbilicate, depressedly turbinate, and, in the single aged specimen found, decorticated, whitish and smooth throughout. Traces of a brown epidermis remain around the umbilicus, and younger specimens are probably brown in colour, and perhaps ornamented with coloured bands, like other species of the genus. Spire raised, depressedly conical, suture deep, apex acute. Whorls 4½, rounded; the last cylindrical, descending, and free near the aperture, and provided above, about three millimetres behind the mouth, with a rather elongate tube, which projects forward, and is in

contact with the penultimate whorl throughout. The tube appears broken at the end, and may have been even longer originally; the anterior termination in the specimen is in a line with the oblique peristome of the shell. Aperture diagonal, circular; peristome double, inner lip sharp, not projecting much, curved backwards near the penultimate whorl; outer peristome expanded, and wavy above externally and below, straight and somewhat narrower on the left margin. Operculum nearly flat externally, concave within; the outer margins of the whorls free and lamellar, except towards the middle; the circumference surrounded by several fine raised lines, the edges of the outermost whorls. Major diameter 0·5 inch, minor 0·42, axis 0·3, diameter of the mouth 0·23.

This species differs from all others of the genus by its higher spire, and by the combination of the mouth being free and the sutural tube being directed forwards and attached to the last whorl. The solitary specimen obtained was procured at a considerable elevation, 4000 or 5000 feet, in the hills between Travancore and Tinnevely, not far from Cape Comorin.

26. *CATAULUS COSTULATUS*, sp. nov., Plate III, Fig. 7.

Testa subperforata, subovato-turrita, solida, subsinuate costulata, pallide straminea. Spira convexo-turrita, apice obtusiusculo, suturâ valde impressa. Anfr. 7½, convexi, ultimus arctius convolutus, antice porrectus fere solutus, carinâ basali validâ, compressâ, costulatâ, antice dilatâtâ munitus; periomphalo mediocri, costulato. Apertura subcircularis, fere verticalis, canali ad latus sinistrum marginis basalis patente, ore subobliquo, subtus spectante. Peristoma album, incrassato-expansum, revolutum, postice dextrorsum atque antice sinistrorsum ad canalem basalem productum, margine columellari angustiore, cum anfractu penultimo breviter juncto. Long. 16, diam. (perist. incl.) 5, diam. min. 5½, apert. intus 3 mm.

HAB. In montibus 'Tinnevely Ghats' dictis Indiæ meridionalis, (H. Beddome).

Shell subperforate, subovately turreted, solid, rather coarsely and subsinuately costulated, of a pale straw-colour. Spire turreted, with convex sides, apex rather obtuse, sutures well impressed. Whorls $7\frac{1}{2}$, convex, the last more closely wound than the penultimate, to which it is scarcely attached just behind the mouth; the basal keel compressed, costulate, dilated in front; the space inside the keel and around the umbilicus is of moderate size and ribbed. Aperture nearly circular and subvertical, with the opening of the basal canal on the left side of the base, and not quite in the same plane as the aperture, but turned rather downwards. Peristome white, thickened, expanded, and turned back, produced above to the right of the penultimate whorl and below around the canal, narrow on the columellar margin, and

only united for a short distance with the penultimate whorl. Length 0·65 inch, breadth (including the peristome) 0·25, minor diameter from front to back 0·23, width of aperture inside 0·13.

This species of *Cataulus*, the third hitherto obtained from the hills of Southern India, is distinguished from all other known forms of the genus by its comparatively coarse ribbing across the whorls. In other respects, it closely approaches *C. calcadensis*, Bedd. (J. A. S. B., 1869, xxxviii. pt. 2, p. 137, pl. xvi. fig. 8), having a similarly shaped spire, aperture, and basal channel. I have only seen one specimen of *C. costulatus*; this differs from *C. calcadensis* not only in having stronger sculpture, but also in being rather shorter and in having one whorl less in the spire. The colour of *C. costulatus* also is paler than that of the Calcad shell, and the lip of the aperture is white.

Like the other Southern-Indian forms, *C. calcadensis*, *C. recurvatus*, and the species hereafter described, *C. costulatus* has the canal a little to the left of the lowest portion of the aperture, or nearer to the umbilicus than to the outer margin. In most Ceylonese species of the genus, the canal is nearly at the lowest portion of the mouth.* I find that in *C. tortuosus* the position of the canal is precisely as in *C. calcadensis* and *C. costulatus* (in *C. recurvatus*, the sinistral position of the canal is much more marked).

27. CATAULUS ALBESCENS, sp. nov.

Testa subperforata, subovato-turrita, tenuiuscula, albido-cornea, subsinuata costulato-striata. Spira turrita, lateribus convexis, apice obtusiusculo, suturâ valde impressâ. Anfr. 7, convexi, ultimus arctius convolutus, antice porrectus, fere solutus, vix descendens, carinâ basali transversim striatâ, postice obsoletâ, antice validâ, juxta aperturam dilatatâ munitus; periomphalo mediocri, plicato-striato. Apertura subcircularis, fere verticalis, canali ad latus sinistrum marginis basalis patente, ore antice spectante. Peristoma album, incrassato-reflexum, postice et ad canalem basalem productum, margine columellari angustiore, cum anfractu penultimo breviter junctum. Long. 13, diam. maj. $5\frac{1}{2}$, min. $4\frac{1}{2}$, apert. diam. intus vix 3 mm.

HAB. In montibus Travancoricis haud procul ab urbe Trevandrum.

Shell subperforate, subovately turreted, rather thin, whitish horny, rather sinuately and costulately striated. Spire turreted, with the sides convex, apex obtuse, suture much impressed. Whorls 7, convex, the last more closely wound than the penultimate, to which it is but slightly attached just behind the mouth. Basal keel transversely striated, subobsolete on the body-whorl near the junction of the peristome, becoming stronger in

* It is slightly to the left in *C. pyramidatus*, *C. eurytrema*, and *C. austenianus*; basal in the smaller forms, like *C. templemanni* and *C. layardi*.

front and dilated near the mouth; the space inside the keel and around the umbilicus is of moderate size and plicately striated. Aperture nearly circular and subvertical, with the opening of the basal canal to the left of the base, and in nearly the same plane as the aperture. Peristome white, thickened, expanded and turned back, produced slightly above to the right of the penultimate whorl, and to a greater extent below at the mouth of the canal; columellar margin a little narrower, joined for a short distance only to the penultimate whorl. Length 0·53, major diameter 0·22, minor 0·18; breadth of the aperture within 0·12 inch.

This is the smallest form yet obtained of the peculiar group of Southern-Indian *Catauli*. I received three specimens some years ago from Mr. Theobald, who supposed them to be *C. calcadensis*. Mr. Theobald, I believe, procured them from Mr. F. W. Bourdillon, who obtained them near Mynall, on the hills east of Trevandrum. This shell is, I think, mentioned as *Cataulus calcadensis* by Mr. Theobald in his description of Mr. Bourdillon's shells (J. A. S. B., 1876, xlv. p. 185). The present species, however, has one whorl less, and is a much smaller shell, with proportionately shorter whorls, the sculpture is less close and distinct, the colour whitish instead of golden brown, the basal keel less developed, and its opening is in the same plane as the aperture, instead of being turned downwards, &c. From *C. costulatus*, the present form is chiefly distinguished by its much finer sculpture and by the characters of the basal keel.

28. CATAULUS CALCADENSIS.

The original specimens of this species described by me in 1869 (J. A. S. B., xxxviii. pt. 2, p. 137) were bleached and chalky. Subsequently, Col. Beddome, who discovered and named this very interesting form of *Cataulus*, procured fresh living specimens of a golden-brown colour, with the aperture of the same tint as the shell.* The peristome in these specimens is not free from the last whorl. The operculum is normal, and precisely similar to that of Ceylonese species of the genus.

The specimens described by Mr. Theobald as *Hapalus travankoricus*† are, I am satisfied, immature shells, and I believe them to be the young of this, of *C. albescens*, or of some nearly allied species of *Cataulus*. Mr. Theobald states that the types of his supposed *Hapalus* differ from the young of *Cataulus calcadensis*, i. e., *C. albescens*, but he omits to point out the distinction. I had an opportunity of examining the types, which were

* I have not seen specimens of the olive colour represented in the 'Conchologia Indica,' pl. cvi, fig. 10.

† J. A. S. B. 1876, xlv. pt. 2, p. 186, pl. xiv. fig. 5. The name should, in any case, be Latinized as *travancoricus*. There is no such place as Travankor, the common English name Travancore being a corruption of the real name.

shown to me by Mr. Theobald, and I told him my views on the subject, but he did not agree with me.

I have recently examined the specimen of *C. tortuosus* (two in number) at the British Museum, and find the views I expressed several years since (J. A. S. B., 1869, xxxviii, pt. 2, p. 138) as to its alliance to *C. calcaedensis* fully confirmed. In form, *C. tortuosus*, *C. calcaedensis*, *C. costulatus*, and *C. albescens* are closely allied, all being much more ovate than any of the other species of the genus. The sculpture on *C. tortuosus* is much finer than on *C. calcaedensis*, or even than on *C. albescens*. The discovery of two additional forms of this section of the genus in the hills of Southern India, and the absence of the genus from the collections hitherto made in the Nicobar Islands, tend to support the probability that *C. tortuosus* is also in reality a Southern-Indian form. Not a single *Cataulus* has hitherto been discovered in the Andaman Islands, in any of the countries to the east of the Bay of Bengal, or in the Malay Islands, so that the existence of the genus in the Nicobar Islands is extremely improbable.

29. REALIA (OMPHALOTROPIS) ANDERSONI, sp. nov., Plate II, Fig. 18.

Testa perforata, ovato-conica, tenuiuscula, rufescenti-fulva, lævigata, parum nitida, oblique striatula. Spira conica, lateribus subrectis, apice acuto, suturâ leviter impressâ. Anfr. 7, planiusculi; ultimus ad peripheriam capillaceo-carinatus, subtus convexus, lævigatus, radiatim striatulus, carinâ circumumbilicari obtusâ, fere obsoletâ instructus. Apertura ovata, obliqua, fere diagonalis, spiram altitudine haud æquans. Peristoma obtusum, marginibus subconniventibus, callo tenui junctis, externo recto, basali expansiusculo, columellari subtus expanso, juxta perforationem emarginato, angulatim inciso. Operc. ? Long. 7, diam. vix 5; ap. long. $3\frac{1}{2}$, lat. $2\frac{3}{4}$ mm.

HAB. In insulis Andamanicis (*J. Anderson*).

Shell perforate, ovately conical, thin, reddish brown in colour, smooth, not polished, obliquely striated. Spire conical, with sides nearly straight, apex acute, suture slightly impressed. Whorls 7, rather flat; the last with a hair-like keel at the periphery (the keel sometimes appearing on the upper whorls just above the suture), convex, smooth, and radiately striated below, and furnished with an obtuse, subobsolete keel around the umbilicus, the space inside the umbilical keel being smooth, not ribbed. Aperture ovate, oblique, nearly diagonal, a little shorter than the spire. Peristome obtuse, the margins approaching each other, and joined by a thin callus; outer edge straight, basal expanded, columellar expanded below, but emarginate and cut away into a re-entering angle near the perforation. Length 0.29, diameter 0.19; length of aperture 0.13, breadth 0.11 inch.

This species closely resembles *R. (O.) rubens* of Mauritius in form, but differs in sculpture, the shape of the whorls, &c. The umbilical keel is but faintly marked. Several specimens were procured about ten years ago by Dr. J. Anderson, Superintendent of the Indian Museum, to whom I am indebted for the types. They were obtained, I believe, at some distance from the coast.

30. *REALIA PALLIDA*, sp. nov., Plate II, Fig. 19.

Testa perforata, ovato-conica, tenuis, albido-cornea, lævigata, nitidula, vix verticaliter striatula. Spira conica, apice acuto, suturá impressá. Anfr. 6, convexiusculi; ultimus ad peripheriam atque subtus rotundatus, circa perforationem radiatim striatus. Apertura fere verticalis, ovata, spiram altitudine haud æquans. Peristoma tenue, marginibus subconniventibus, callo tenui junctis, externo recto, columellari expansiusculo. Operc.? Long. $4\frac{1}{4}$, diam. 3; ap. long vix 2, lat. $1\frac{1}{2}$ mm.

HAB. In insulis Andamanicis cum præcedente (*J. Anderson*).

Shell perforate, ovately conical, thin, whitish horny, smooth, moderately polished, with faint subobsolete vertical striation. (There is also, beneath the lens, a faint indication of minute spiral striation, but I am not sure that this is not an individual peculiarity.) Spire conical, apex acute, suture impressed. Whorls 6, slightly convex, the last rounded at the periphery and below, radiately striated around the perforation. Aperture nearly vertical, ovate, shorter than spire. Peristome thin, margins approaching each other, joined by a thin callus; the outer lip simple, the columellar slightly expanded. Length 0·17, diameter 0·12, length of aperture 0·075, breadth 0·06 inch.

I have but a single specimen of this species, which wants both the keels of the last species, and differs besides in size, colour, and sculpture. The specimen is perhaps not quite adult, but there can, I think, be no question of its being a peculiar form.

Neither of the two species above described can be confounded with the globose *R. (O.) disterrina* (Benson, Ann. & Mag. N. H. Dec. 1863; Pfeif., Mon. Pneum. Suppl. ii. p. 178) with its costulate striation near the suture and inside the umbilicus, its rounded whorls, and its aperture equal in length to the spire. A glance at the figure of this shell in the 'Conchologia Indica,' pl. clxv. fig. 10, will suffice to show how different it is from either *R. andersoni* or *R. pallida*. Even if, as is possible, Benson's type was a young shell, it was manifestly a very distinct species, and the adult would probably resemble *Realia (Omphalotropis) globosa* of Mauritius in shape.

31. *REALIA* DECUSSATA, sp. nov.

Testa perforata, ovato-conica, tenuiuscula, striis obliquis incrementi, aliisque spiralibus, minutis, sublente subtilissime decussata, in anfractibus superioribus, nisi duobus supremis, undique, atque in inferioribus et supra et infra euturam costulato-striata, pallide rufescenti-fulva, anfractu ultimo cingulo pallido circumdato. Spira conica, apice acuto, sutura impressâ. Anfr. 6, convexi; ultimus ad peripheriam rotundatus, subtus convexus, radiatim striatus, in umbilico costulato-striatus, lineâ impressâ basali in loco carinæ circum umbilicum instructus. Apertura obliqua, rotundato-ovata, $\frac{3}{7}$ longitudinis subæquans. Peristoma tenue, marginibus subconniventibus, callo tenui junctis, externo basaliq̄ue rectis, columellari subtus expansiusculo, juxta perforationem retrosinuato. Operc. ? Long. $3\frac{3}{4}$, diam. $2\frac{3}{4}$; ap. long. $1\frac{3}{4}$, lat. $1\frac{1}{2}$ mm.

HAB. Cum præcedentibus in insulis Andamanicis (*J. Anderson*).

Shell perforate, ovately conical, rather thin, finely marked with oblique striæ of growth and minute decussating spiral lines (only visible beneath the lens), costulately striated on the upper whorls (except the two uppermost) and close to the suture on the lower whorls, pale rufescent brown, with a pale band round the body whorl. Spire conical, apex sharp, suture impressed. Whorls 6, convex; the last rounded at the periphery and below, radiately striated beneath, more strongly in the umbilicus, and having an impressed line at the base around the umbilicus in the place of a keel. Aperture oblique, oval, but little higher than broad, about $\frac{3}{7}$ of the length. Peristome thin, the margins approaching each other and united by a thin callus; the outer and basal edges simple, columellar margin slightly expanded below, curved back into a shallow re-entering sinus close to the perforation. Length 0.15, diameter 0.11; length of aperture 0.07, breadth 0.06 inch.

This shell is distinguished by its fine decussated striation. I have but a single specimen, received from Dr. J. Anderson, with the others. Unfortunately no figure has been given, as I did not observe the distinction until after the accompanying plate had been drawn. Independently of sculpture, the species may be distinguished from *O. disterrina* by its less globose form, and by the absence of the keel around the periphery; from *R. andersoni* by its much smaller size, more rounded whorls, and by the absence of the keel; and from *R. pallida* by rounder whorls, by colour, and by its rather more turreted form.

There is thus evidence of four different forms of *Realia* in the Andaman Islands. The genus is absolutely unknown in either India or Burma, the species of *Omphalotropis* (*O. aurantiaca*) once reported from

Pondicherry being really from the island of Mauritius;* and it is uncertain that the forms reported from Cochin China, Siam, and Singapore are not *Assimineæ*. It is remarkable that the genus is almost entirely insular in its known distribution, and that it is especially common in the Mascarene Islands and in Polynesia.

32. PALUDOMUS TRAVANCORICA, *Beddome*, MS., Plate II, fig. 22.

Testa imperforata, ovato-conica, solidula, epidermide fuscâ induta, sub epidermide albida, fasciis fusco-purpureis flexuosis verticalibus ornata, costis spiralibus subconfertis circumdata, interspatiis glabris, striis incrementi inconspicuis. Spira conica, subturrita, apice eroso, suturâ impressâ. Anfr. superst. 3, convexi, ultimus dimidium testa superans. Apertura subverticalis, ovata, postice angulata, intus cærulescenti-albida, strigis flexuosis confertis conspicuis. Peristoma rectum, margine externo acuto, columellari basaliq̄ue albis, intus incrassatis, dilatatis. Opere. normale. Diam. maj. 16, min. 13½, alt. 23 mm. (apice non eroso ad 25); apert. 12 mm. longa, 9 lata.

HAB. In Travancore (*H. Beddome*).

Shell imperforate, ovately conical, rather thick, covered with a dark-brown epidermis; beneath the epidermis white, with narrow vertical, very wavy dark purple stripes; all the whorls spirally ribbed, the ribs rather close together, with the interspaces smooth, the striæ of growth being inconspicuous. Spire conical, apex eroded (doubtless acute when perfect), suture impressed. Whorls remaining 3 (probably in the perfect shell 5 or 6), convex, the last exceeding half the length of the shell. Aperture nearly vertical, ovate, angulate at the posterior extremity, bluish white, with conspicuous, close, vertical, wavy, deep purple bands within; peristome in one plane, the external margin sharp, the columellar and basal margins white, thickened within, and dilated. Operculum normal. Major diameter 0·65 inch, minor 0·52, height (apex wanting) 0·9 (when perfect about an inch); aperture 0·5 high, 0·36 broad.

In a young specimen of *P. travancorica*, there appears to be a tendency to the development of minor parallel ribs between those forming the spiral sculpture, and the latter are rather closer together near the suture.

* See Benson, A. M. N. H. Sept. 1851, Ser. II, Vol. 8. p. 194.—Nevill, Handlist Moll. I. M. pt. i, p. 320. Hanley, Conch. Ind. Systematic list of Species, p. xiii, note 1, whilst pointing out that the species is not Indian, states that it occurs in the Isle of Bourbon. As he does not give his authority, the name of the island may have been inserted by mistake for that of Mauritius, but it is possible that the form occurs, like *O. rubens* and two or three other species, in both islands.

This fine and well-marked form of *Paludomus* was procured by Colonel Beddome in streams traversing the plains between Trevandrum and the foot of the Aghastiyamali hill.

So far as I am aware, none of the forms of true *Paludomus* hitherto described from Southern India and Ceylon have the marked spiral sulcation of the present species. There is, however, a remarkable resemblance to the Ceylonese *Philopotamis sulcata*, the shell of which is only distinguished by wanting the conspicuous coloured bands within the peristome, although the operculum is very different. Perhaps the nearest ally of *P. travancorica* is the Burmese *P. regulata*; but that is a less conical form, and differs both in sculpture and coloration, as may be seen by comparing the figure of the present species with that of *P. regulata* in the 'Conchologia Indica' (pl. cviii. fig. 5). In form, *P. travancorica* has some resemblance to the common *P. tanjorica** (*Helix tanshaurica*, Gmelin, Syst. Nat. p. 3655).

33. BYTHINIA EVEZARDI.

Testa anguste umbilicata, ovato-conica, solida, striis regularibus spiritaliter circumdata, albido-cornea, epidermide crassâ olivaceâ oblecta. Spira conica, apice eroso, suturâ valde impressâ. Anfr. superst. 3 (in testâ integrâ 4-5), convexi, ultimus dimidium longitudinis subæquans, modice ventricosus, subtus circa umbilicum angulatim compressus, umbilico conico, intus lævigato. Apertura subverticalis ovata, antice atque postice subangulata; peristoma simplex, rectum, obtusum. Operculum normale. Long. $3\frac{3}{4}$, diam. maj. $3\frac{1}{4}$, min. 2 mm.; apert. intus fere 2 longa, $1\frac{1}{3}$ lata.

HAB. Ad Lanowlee (Lanaoli) juxta viam ferratum inter Bombay et Poona (G. Evezard).

Shell narrowly umbilicate, ovately conical, solid, surrounded by regular spiral impressed lines rather close together, whitish horny, covered with an olive epidermis. Spire conical, apex eroded, suture deeply impressed. Whorls remaining 3 (in a perfect shell about 4 to 5), rounded, the last about half the whole length, moderately ventricose, angulately compressed at the base around the umbilicus, which is conical and smooth inside. Aperture nearly vertical, oval, subangulate in front at the base and at the posterior extremity; peristome simple, straight, obtuse; operculum normal. Length 0.15, major diameter 0.13, minor 0.08 inch; aperture within 0.07 long, 0.05 broad.

This peculiar little species, distinguished by its distinct umbilicus from all other Indian forms, was obtained by Colonel G. Evezard at Lanaoli, a station on the railway from Bombay to Poona, situated a few miles east of Khandalla at the top of the Bor-ghat.

* I think it is to be regretted that Gmelin's spelling should be adopted for this species, as the derivation of the name is thereby rendered obscure.

35. CREMNOCONCHUS FAIRBANKI.

"*Cremnoconchus fairbanki*, Blanford," Hanley, *Conch. Ind.* p. 58, pl. cxlvi, fig. 7.

I have described the species here attributed to me, and I greatly doubt my being responsible for the specific name, even in manuscript. I find amongst my collection a small box of *C. carinatus*, labelled *C. fairbanki*, but I cannot recollect whence the name was derived. The shell figured in the 'Conchologia Indica' resembles *C. carinatus* in form, but the angulation of the last whorl is not shewn, and the coloured bands represented are not, so far as I know, found in that species.

The shell figured in the same plate of the 'Conchologia Indica' (pl. cxlvi, fig. 10) as *C. carinatus*, is certainly not that species, but *C. conicus*, var. Some of the references in the letterpress, p. 58, to my descriptions and figures of *Cremnoconchus* (*J. A. S. B.* 1870, xxxix, pt. 2, pp. 10—12, pl. 3, figs. 3, 4, 5) are incorrect.

36. CORBICULA IRAVADICA.

"*Cor. iravadica*, Blanf. MSS." Hanley, *Conch. Ind.* p. 62, pl. clv, fig. 8.

Testa fere æquilateralis, rhomboideo-ovata, ventricosa, solidiuscula, concentricè striata atque costulis subremotis, interdum plus minusve obsolete, ornata, epidermide olivaceâ induta, intus violacea: latere antico ante umbones prominentes subhorizontali, tunc fere regulariter convexo, postico declivi, oblique subtruncatulo, demum subangulato, margine ventrali modica arcuato; ligamento postice subito contracto. Lat. 10½ mm., long. 9, crass. 7. In alio exemplo long. 11½, lat. 8½, crass. 7.

HAB. Ad Mandalay, urbem capitalem regni Avæ.

Shell nearly æquivalve, rhomboidally ovate, ventricose, thickish, concentrically striated and ornamented with ribs rather wide apart often more or less obsolete. The colour of the epidermis is olive, that of the shell inside violet. Anterior side nearly horizontal in front of the prominent umbones, then almost regularly convex, the posterior side slopes away gently at first, then sharply, almost as if truncated, and forms a rounded angle with the ventral margin, which is gently arcuate. The ligament behind is suddenly contracted and compressed, the hindermost portion, about a quarter of the length being very much smaller than the rest.

Dimensions of one specimen:—length 0·42 inch, breadth from umbones to ventral margin 0·36, thickness 0·28; of another much longer shell, the same measurements are 0·46, 0·34, and 0·28 inch.

It is very possible that this may not be separable from some of the numerous other forms of the genus, but I can find none precisely agreeing. The form is more ventricose and the umbones more prominent than in most

Indian *Corbiculæ*. The genus, like *Unio*, appears to have been designed by a beneficent Providence for the amusement of species-makers. Many of the described local races in all probability pass more or less into each other.

EXPLANATION OF THE PLATES.

Plate II.

- Fig. 2. *Euplecta vidua*, var. *minor*, natural size.
 „ 4. This shell has not been described, the type having been mislaid, and one figure, that shewing the shell from the mouth, omitted in the plate.
 „ 5. *Euplecta vidua*, typical form, natural size.
 „ 8. *Macrochlamys tenuicula*, two views, natural size. In the left hand figure one whorl too many is represented, and in the right hand figure the peristome is represented as thick instead of very thin.
 „ 9. *Macrochlamys platychlamys*, two views, natural size. In the right hand view the lip should have been represented as very thin.
 „ 10. *Streptaxis personatus*, three views, enlarged two diameters, fair.
 „ 11. *Streptaxis concinnus*, three views, enlarged two diameters, teeth rather indistinct, otherwise good.
 „ 12. *Streptaxis pronus*, three views, enlarged two diameters, teeth not correctly represented; see description.
 „ 13. *Streptaxis compressus*, three views, enlarged four diameters; the teeth are incorrect, especially in the middle figure, where three are represented on the basal margin of the aperture instead of one only.
 „ 14. (Upper figure) *Ennea subcostulata*, enlarged four diameters. The columellar tooth should be lower down.
 „ 14. (Lower figure) *Ennea exilis*, enlarged four diameters. All the teeth are wrongly represented; see description.
 „ 15. *Ennea macrondon*, enlarged four diameters. The teeth in the peristome are not distinct in the figure, and the large tooth inside the base is omitted altogether.
 „ 16. *Ennea stenostoma*, var., enlarged four diameters. Teeth not correct, they should be precisely the same as in fig. 17.
 „ 17. *Ennea stenostoma*, typical form, enlarged four diameters. The mouth too broad, it should be of the same shape as in fig. 16. The teeth are correct.
 „ 18. *Realia (Omphalotropis) andersoni*, enlarged two diameters: fair figure.
 „ 19. *Realia pallida*, enlarged two diameters, not good, the penultimate whorl is by far too large, and the suture wrongly drawn.
 „ 22. *Paludomus travancoricæ*, natural size, good figure.

N. B. As already noticed in the text, several of the figures in this plate are unsatisfactory. In especial, the teeth in the aperture of some forms of *Ennea* and *Streptaxis* are by no means accurately represented. The plate having been twice lithographed, it appears hopeless at present to try to obtain greater accuracy. The general form of the shells is as a rule correct. The imperfection of the plate is partly due to its having been lithographed during the absence of the author of the present paper.

Plate III.

- Fig. 1. *Hemiplecta tinostoma*.
 „ 2. *Hemiplecta enisa*.
 „ 3. *Xestina albata*.
 „ 4. *Ariophanta immerita*.
 „ 5. *Macrochlamys wynnei*.
 „ 6. *Spiraculum travancoricum*.
 „ 7. *Catantulus costulatus*.

N. B. The figures on this plate are all fairly good; all are of the natural size except 7b.



